This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

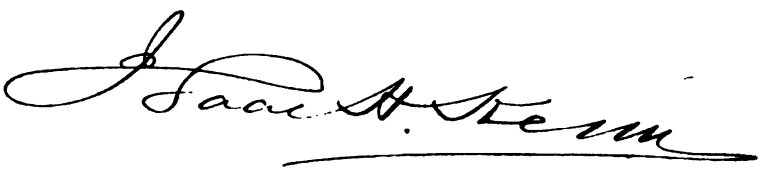
Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

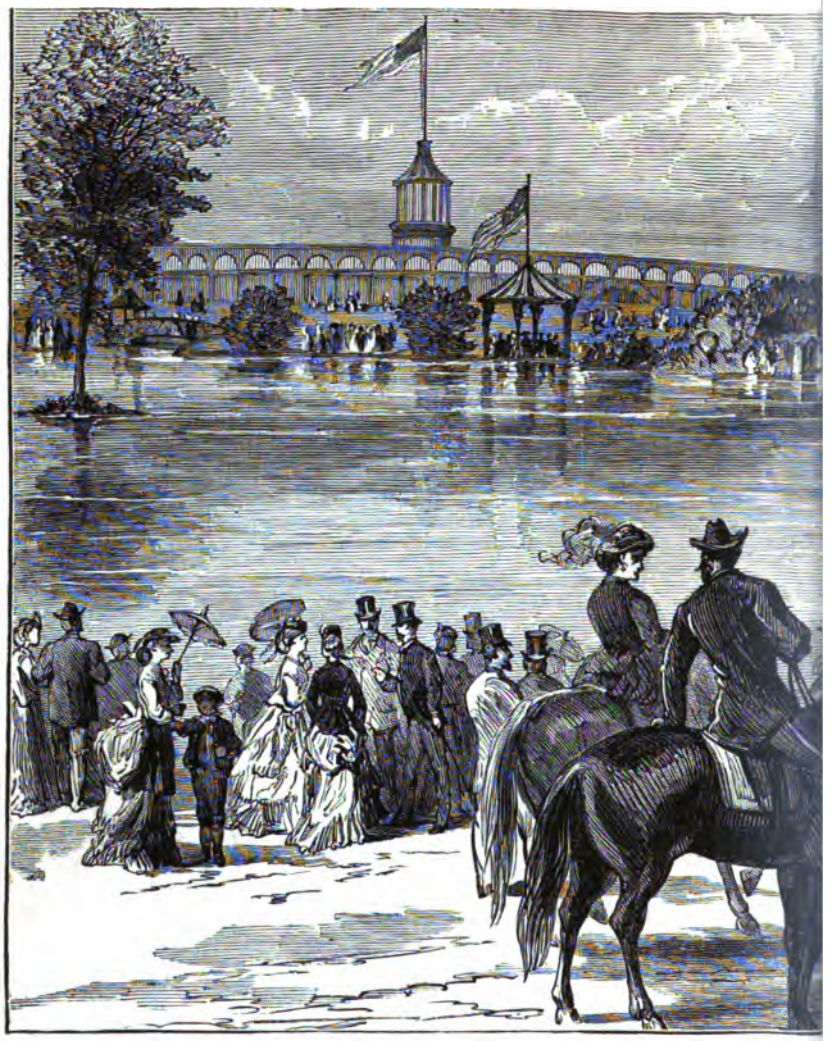
B 431648

PRESENTED BY
JOHN F. WIELANDY,
SECRETARY
Missouri State Board of Agriculture.

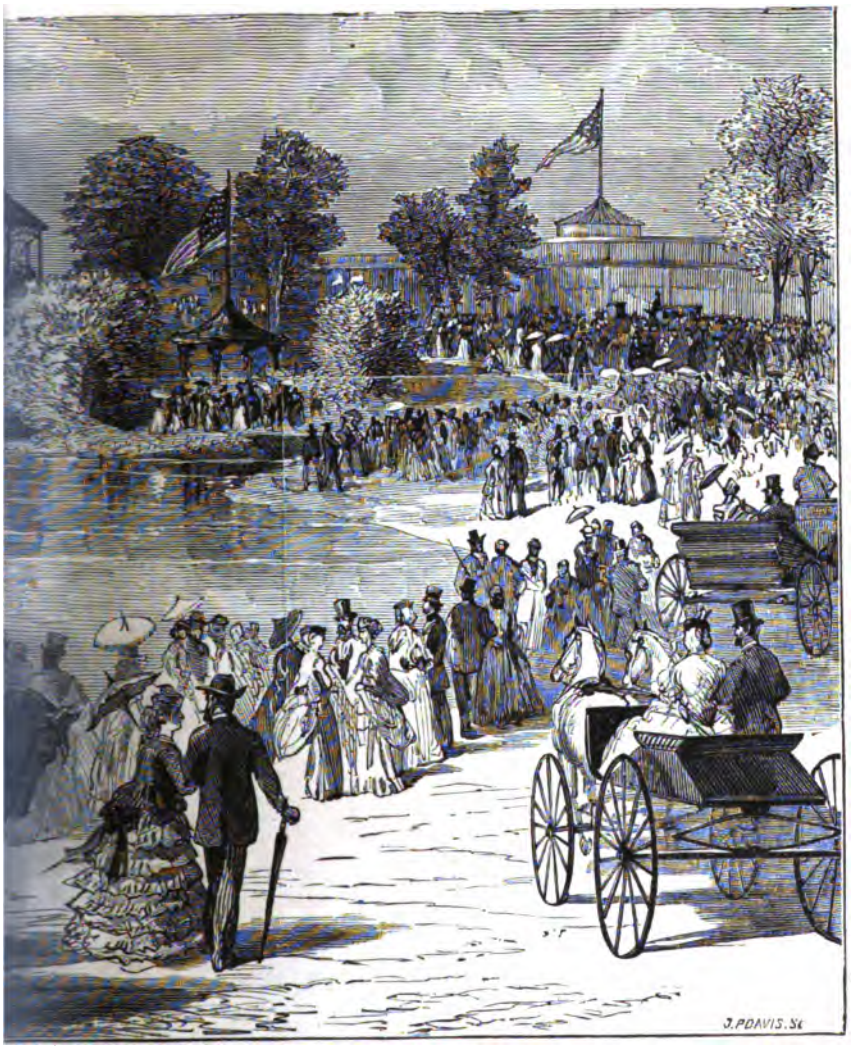
S
81
A3

4.18.4.2.





St. Louis Fair.—



w of the Grounds.

19848

SEVENTH ANNUAL REPORT

OF THE

STATE BOARD OF AGRICULTURE,

WITH AN

ABSTRACT OF THE PROCEEDINGS

OF

AGRICULTURAL AND HORTICULTURAL SOCIETIES

FOR THE YEAR 1871.

EDITED BY

JOHN F. WIELANDY, Corresponding Secretary

JEFFERSON CITY, MO.:
REGAN & EDWARDS, PUBLIC PRINTERS.
1872.

MEMBERS OF THE STATE BOARD OF AGRICULTURE FOR 1872.

His Excellency Governor B. GRATZ BROWN	*Ex officio.*
Rev. JOHN MONTEITH, Superintendent of Public Schools	*Ex officio.*
HENRY T. MUDD, President	St. Louis county.
JOHN W. HARRIS, Vice-President	Boone county.
WM. T. ESSEX, Treasurer	St. Louis county.
NORMAN J. COLMAN	St. Louis county.
G. W. KINNEY	St. Charles county.
GEORGE HUSMANN	Montgomery county.
O. H. P. LEAR	Marion county.
BARNABAS SMITH	Crawford county.
WILLIAM STARK	Pike county.
CHARLES E. LEONARD	Cooper county.
J. J. SQUIRE	Jefferson county.
JOHN F. WIELANDY, Corresponding Secretary	Cole county.
CHARLES V. RILEY, State Entomologist	St. Louis.
JOHN H. TICE, Recording Secretary	St. Louis.

To the General Assembly of the State of Missouri:

In compliance with the provisions of the eighth section of the law incorporating the Missouri State Board of Agriculture, the seventh annual report, embracing the proceedings of the Board for the year 1871, together with an abstract of the reports and proceedings of the several agricultural and horticultural societies, as well as a general view of the condition of agriculture and horticulture throughout the State, accompanied by such recommendations, including, especially, such a system of public instruction upon those subjects as may be deemed interesting and useful, is herewith respectfully submitted.

PREFACE.

It is with some diffidence that the present Corresponding Secretary has assumed the unexpected and hitherto unusual responsibility of presenting to the highly intelligent men who constitute the reading portion of our agricultural community, a report which, although edited by him, is not properly his own, but rather, in reality, that of his predecessor, Mr. C. W. Murtfeldt, the former Corresponding Secretary of the State Board of Agriculture.

In passing a critical judgment upon the contents of this volume, the editor must, therefore, remind the reader that many of its merits, as well as its deficiencies, (if it may be said to possess either,) are attributable even more to the gentleman alluded to than to himself.

While representing his county in the Legislature last winter, the writer succeeded in procuring an appropriation sufficient to print four thousand copies of an abridged edition of the present report in the German language—a novel experiment, but one which, if successfully accomplished, (and there is no reason to doubt that it will be,) must result in great benefit, by attracting to our State a large number of the most desirable class of immigrants, through the statistics and accounts of our manifold agricultural, horticultural, and mining advantages.

The result thus attained, while most desirable and gratifying, imposes a laborious task on the Corresponding Secretary, who will have to prepare and edit three different reports during the course of the present year, while his predecessor had but one annual report to make.

Some new features will be noticed in this volume, among which may be mentioned the report of the St. Louis Fair, and list of premiums of the St. Louis Tobacco Association for the growing crop of 1872, and also the proceedings of a convention of presidents and professors of agriculture, held at Chicago, Illinois, on the 24th and 25th days of August last. In regard to the latter, it must be owned that the style of the learned gentlemen who convened in Chicago can not

be held up as a model of terseness; in fact, it is far from possessing that laconic brevity once so dear to the Spartans, and now so little valued and so seldom practiced. It was, however, deemed appropriate to republish these debates in simple justice to Mr. Murtfeldt, the late Corresponding Secretary of the Board, who took a leading part in the proceedings of the Convention, and also in order to comply with the requirements of the Statute, which provides "that the report of the State Board of Agriculture shall be accompanied by such recommendations, including especially such a system of public instruction upon the subjects of agriculture and horticulture, as may be deemed interesting and useful."

The great fair, held yearly in St. Louis, is the pride of every Missourian, not less than the wonder of the whole nation. In importance, it surpasses the fairs of the wealthiest and most populous States of our Union, and its rapid onward strides already betoken a day not far distant when it must assume the proportions and reputation of a National Exhibition of Industry and Agriculture. The absence of a full report of its proceedings in former volumes published under the auspices of the State Board of Agriculture has given rise to severe criticisms, and its incorporation into the present volume will be received with much satisfaction.

The county reports will be found unusually interesting and useful, a larger number of counties being represented than has ever been the case before. It was found necessary to condense and re-write many of these reports—a task performed by the present Secretary, and involving some difficulty, and no inconsiderable amount of labor.

Several ably written essays, due to the pen of leading agriculturists and horticulturists of our State, have received an insertion in this volume, and will be found to contain much useful and valuable practical information. Among these, the papers on "The Influence of Mining Industries on Agricultural Pursuits," by R. O. Thompson, "Prospects of the Native Wine Trade," by Isidor Bush, "Blue Grass," by O. H. P. Lear, and the "Essay on Sheep Husbandry," by G. W. Kinney, (the latter two gentlemen being both members of the State Board of Agriculture,) deserve a special mention, and will, undoubtedly, receive the attention they richly merit.

The Report of the State Horticultural Society is the best yet published, and reflects credit upon its able and accomplished Secretary. The address of the President, Hon. H. M. Vories, is a masterly composition, and a compend of practical, interesting facts in horticulture. The State Horticultural Society has before it a wide field of usefulness, and it shows the true spirit in grappling with the task it has set itself to do.

As usual, the Report of the State Entomologist is embraced in this volume. To commend Mr. C. V. Riley would be useless, for he deserves more than praise; the works of the modest and unselfish *savant* who has devoted his best energies, and the love of his whole

life, to one of the most attractive, but at the same time one of the most intricate and diffusive branches of the natural sciences, will praise themselves better to posterity than it could be done in a simple preface. Mr. Riley's report is, as usual, full of instructive practical facts, important to the pomologist and the farmer, and is embellished with a number of fine illustrations, due to his own pencil, for he is, although the fact is perhaps not generally known, almost as accomplished an artist as he is a scientist.

It is with unfeigned satisfaction that the writer, himself a member of the Twenty-sixth General Assembly of the State of Missouri, and Chairman of the House Committee on Agriculture, records the welcome fact that the Legislature has at last entered upon the path of advance in the direction of progressive agricultural legislation. While all has not been accomplished that the friends of progress may have hoped for and expected, a few useful measures have been enacted, and the way paved for future legislative action.

A bill to provide for the organization of counties into municipal townships, and an act providing for the licensing of dogs, and for the protection of sheep and other domestic animals, have both become laws, subject to adoption by the different counties, and it is to be expected that localities that desire to enjoy the benefits of these much needed reforms, will embrace the first opportunity to bring them before the people for their adoption or rejection.

A bill was also introduced and passed during the last session, entitled "An act to amend the law concerning dram-shops, and to promote temperance, and encourage the production of native wines in this State." This law, it is confidently believed, will not only open a more remunerative market for our native wines, but is calculated at the same time to promote morality and temperance, by substituting a taste for the pure juice of our native grapes, in place of the morbid appetite that craves the use of villainous distilled compounds.

All that is wanted to elevate Missouri to the queenly rank she is destined to occupy among her sisterhood of States, is to develop the wonderful resources Providence has so bountifully spread beneath the surface of her soil; to open her mines; to till her fields by the assistance of improved methods of agriculture; to encourage and promote education, and the diffusion of morality and intelligence, among the young generation that is growing up to fill our places, when we have departed for the "undiscovered country from whose bourn no traveler returns."

Our lands, to quote the beautiful language of a classic writer, are distinguished by an abundance of wood, water and natural grasses; the air is mild and the climate temperate; our fruits are among the most delicious; the fertility of the soil invites and rewards the husbandman.

It is for this earthly paradise that nature has reserved her choicest favors, and her most curious workmanship.

CONTENTS.

Page.

Proceedings of State Board of Agriculture..... 9
Proceedings of State Horticultural Society..... 43
Kansas City Exposition of 1871..... 113

REPORT OF CORRESPONDING SECRETARY:

Annual report of C. W. Murtfeldt for 1871..... 3

ESSAYS:

The Honey-Bee—Will it Pay? By L. C. Waite..... 33
Blue Grass. By O. H. P. Lear..... 37
The Cattle of the Lowlands. By Dr. H. J. Detmers..... 41
Influence of Mining Industries on Agricultural Pursuits. By R. O. Thompson..... 50
Asparagus and its Culture. By J. F. Wielandy..... 64
Origin and Physiology of Varieties. By J. F. Wielandy..... 72
Prospects of the Native Wine Trade. By Isidor Bush..... 77

ST. LOUIS TOBACCO ASSOCIATION:

Address of..... 87
List of premiums for growing crop of 1872..... 91
Fourth annual exposition of..... 95

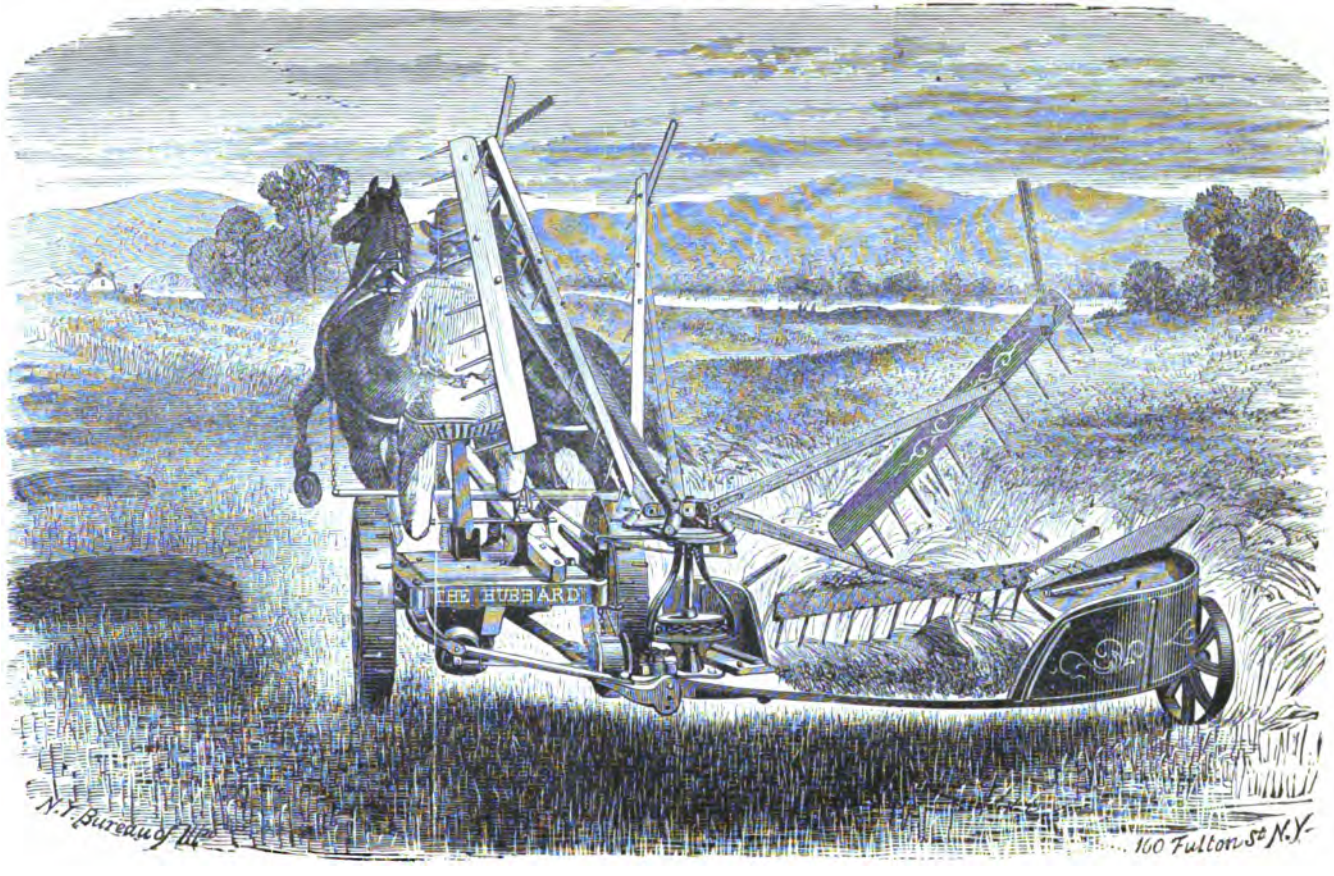
AGRICULTURAL EDUCATION:

Proceedings of a Convention held at Chicago, Illinois, August 24, 1871..... 107

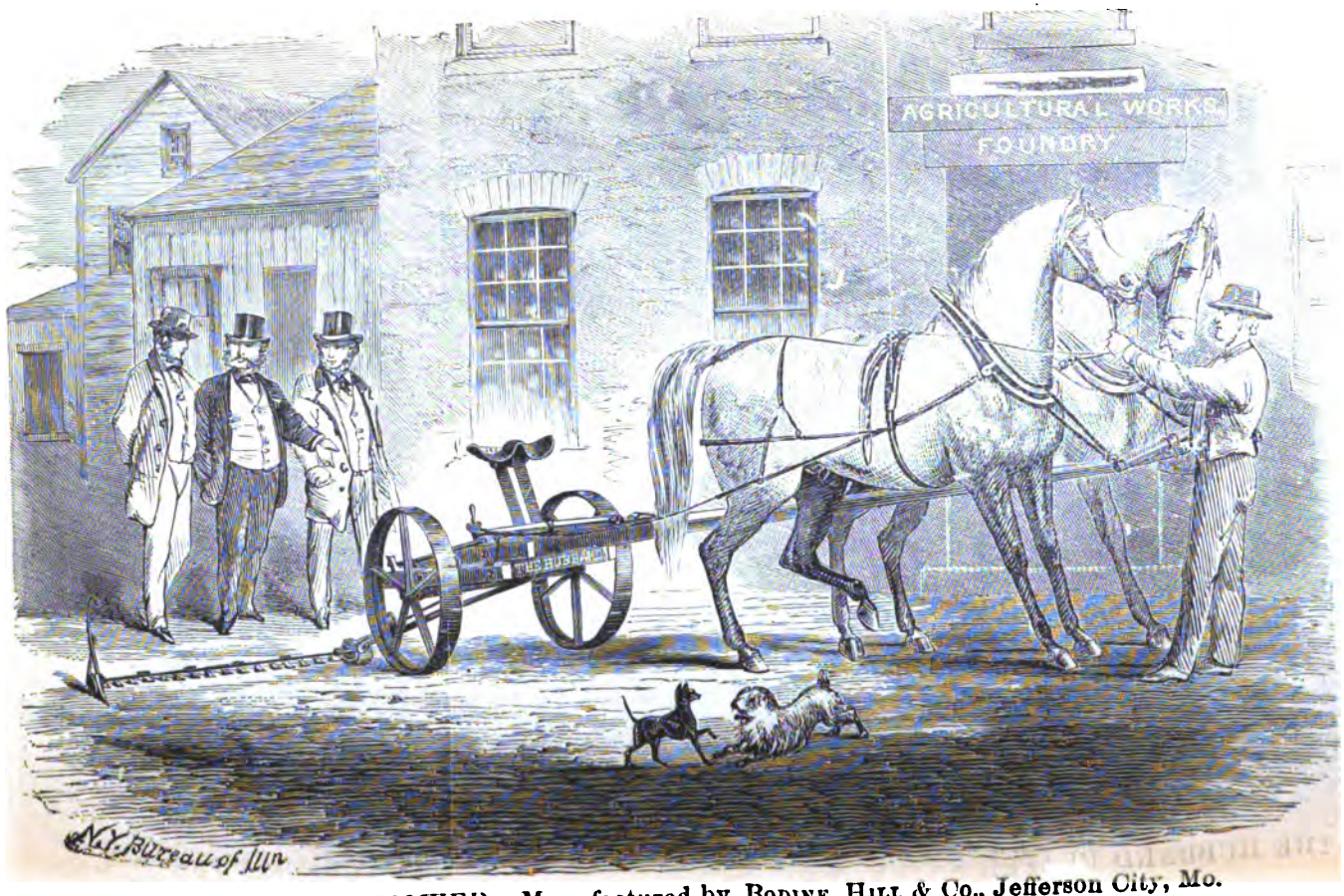
COUNTY REPORTS..... 225

APPENDIX:

Essay on Sheep Husbandry. By Hon. G. W. Kinney..... 335
Mississippi Valley Grape-Growers' Association, Proceedings of Fifth Annual Meeting..... 343
North-east Missouri Horticultural Society, Proceedings of..... 365
Farmers' Clubs of Jasper county..... 368



THE HUBBARD REAPER AND MOWER.—Manufactured by Bodine, Hill & Co., Jefferson City, Mo.



THE HUBBARD MOWER.—Manufactured by Bodine, Hill & Co., Jefferson City, Mo.

PROCEEDINGS

OF THE

MISSOURI STATE BOARD OF AGRICULTURE.

OFFICE OF STATE BOARD OF AGRICULTURE,
ST. LOUIS, April 28, 1871.

Pursuant to a call of the President, the Missouri State Board of Agriculture held a session at its office, in the city of St. Louis, this day.

Present—Wm. S. Dyer, of Jefferson county; William Essex and Henry T. Mudd, of Saint Louis county; John W. Harris, of Boone county; Geo. W. Kinney, of Warren county; O. H. P. Lear, of Marion county; James Moore, of Franklin county; Barnabas Smith, of Crawford county; and John F. Wielandy, of Cole county.

Absent—N. J. Colman, of St. Louis county; George Husmann, of Montgomery county; and William Stark, of Pike county.

A quorum being present, the President stated that he had convened the Board for the purpose of transacting the following business, namely: To agree upon questions for discusssion at the next annual fair of the St. Louis Agricultural and Mechanical Association, and to consider certain proposed amendments of the by-laws.

He then read the by-laws that it was proposed to change, and the by-law prescribing the mode of procedure in making changes, and asked whether the form had been complied with. It appearing that it had not, the President declared the proceedings to have been irregular, and that therefore the proposition for amendment was out of order.

The Board then proceeded to consider subjects for discussion, and, having agreed upon the same,

On motion of Mr. Wielandy, it was

Resolved, That each member be allowed to select from the subjects such question as he prefers to discuss; and in case any question remains unselected, the Board will assign it to some person competent and willing to open the discussion.

Mr. Lear chose the subject of Blue-grass, and Mr. Wielandy that of Gardens. There being no further selections, the Board assigned the subjects as follows:

1. Cattle for special uses, and show animals—are they injured in reproductive stamina by the mode they are fitted for exhibition?—to N. J. Colman.
2. Swine—the best breeds and their management—to Wm. T. Essex.
3. Sheep—best breeds for mutton and wool, and their management—to G. W. Kinney.
4. Meadows—how to make and how to improve them—to Judge Moore.
5. Manufacturing, as connected with and benefiting Agriculture—to Geo. Husmann.
6. Rural Architecture and adornment of Country Homes—to B. Smith.
7. Farms—the best method for the Farm and Farmer, based on the author's experience—to John W. Harris.
8. The Honey Bee—will it pay?—to L. C. Wait.
9. Orchard Culture—to Wm. Stark.
10. Missouri—the best Grape Growing and Wine Producing State—to W. S. Dyer.
11. Garden Vegetables and Small Fruits—best and most profitable varieties, and their mode of culture—to Mr. Wielandy.
12. The best manner of sowing and perpetuating Blue-Grass Pastures—to O. H. P. Lear.

On motion of Mr. Harris, it was

Resolved, That Professor Riley be most respectfully invited to introduce the subject of Practical Entomology for discussion.

On motion of Mr. Lear, it was

Resolved, That this Board recommend to our Senators and Representatives in Congress to use their utmost influence to establish a Department of Agriculture, whose head shall be a Cabinet officer.

On motion, it was

Resolved, That this Board take a trip for agricultural observation in Kansas and Colorado, in conjunction with State Agricultural Society of Kansas—leaving St. Louis on Monday, the 5th day of June.

Resolved, That if it be deemed advisable, the trip be extended to Utah, provided proper facilities can be obtained.

On motion of Mr. Wielandy, it was

Resolved, That none of the public funds are to be appropriated or expended, directly or indirectly, to defray any expenses incurred in said trip.

On motion of Mr. Harris, it was

Resolved, That we offer one hundred dollars premium for the best farm, containing not less than one hundred and sixty acres.

2. A premium of one hundred dollars for the best farm, not less than forty acres.
3. A premium of fifty dollars for the best hedge, not less than half a mile long, for the year 1871.
4. A premium of fifty dollars for the best conducted vineyard, not less than one acre, for the year 1871.
5. A premium of fifty dollars for the best conducted orchard, not less than two acres, for the year 1871.
6. A premium of one hundred dollars for the best five acres of wheat, for 1872.
7. A premium of one hundred dollars for the best five acres of corn, for 1872.

Resolved, That any person competing for these premiums shall furnish a detailed statement of the management, expenses, receipts and profits thereof, for publication in the annual report of this Board.

Mr. Wielandy submitted the following resolution, which was adopted:

Resolved, That in view of the fact that but a bare quorum of members is now present, no important change be made until a sufficient number of members are in attendance to carry questions by an absolute majority of the Board.

The Board then went into an executive session, and after due deliberation, passed the following resolutions:

Resolved, That the salary of the Corresponding Secretary shall be at the rate of eighteen hundred dollars per annum, from the first day of April, 1871.

Resolved, That the salary of the Recording Secretary shall be increased from seventy-five to one hundred dollars per annum, to date from the first day of April, 1871.

Resolved, That the Corresponding Secretary be required to have his annual report completed, to be presented to the Board at its annual meeting.

Resolved, That the Corresponding Secretary be required to report the discussions of the Board for publication in the annual report.

On motion, the Board then adjourned.

JOHN H. TICE,
Recording Secretary.

OFFICE OF STATE BOARD OF AGRICULTURE,
ST. LOUIS, Dec. 6, 1871.

Pursuant to the provisions of the organic law, the Missouri State Board of Agriculture held its annual meeting this, the first Wednesday of December.

Present—Henry T. Mudd, President; John W. Harris, Vice-President; Wm. T. Essex, N. J. Colman, George Husmann, Wm. Stark, Barnabas Smith and George W. Kinney, of the incorporated members; J. L. Stephens, of the Cooper County Agricultural and Mechanical Association, and Judge Chas. A. Bailey, of the Callaway County Agricultural and Mechanical Association, *ex-officio* members.

Absent—Dr. W. S. Dyer, James Moore, John F. Wielandy and O. H. P. Lear, of the incorporated members, and His Excellency Gov. B. G. Brown and Hon. John Monteith, Superintendent of Public Schools, of the *ex-officio* members.

In consequence of a disarrangement and accidents of the Pacific Railroad, many of the members and officers were detained several hours after the hour for meeting.

On motion, the Board then adjourned to 2 o'clock P. M.

AFTERNOON SESSION.

The Board met pursuant to adjournment.

Present—Same as in the forenoon.

The Corresponding Secretary, C. W. Murtfeldt, read his annual report.

Also, a paper in relation to immigration.

Col. Colman offered a resolution to refer the report, essays and papers to a special committee, but, on consideration, withdrew the same.

The Recording Secretay made the following report:

MR. PRESIDENT: In behalf of the Executive Committee of the Board, I beg leave to submit the following report of the accounts audited, allowed, and warrants issued upon the Treasurer, during the year just closed:

1870.			
December 7....	John F. Wielandy, expenses	$9 00	
.....	O. A. A. Gardner, expenses	12 00	
.....	B. Smith, expenses	9 00	
.....	Wm. Stark, expenses	12 00	
.....	O. H. P. Lear, expenses	13 75	
.....	J. W. Harris, expenses	13 50	
.....	James Moore, expenses	9 00	
.....	Wm. S. Dyer, expenses	9 00	
.....	Insurance Exchange, rent to January 1, 1871	41 66	
			$128 91
December 23...	C. V. Riley, expenses	$18 10	
December 31...	C. V. Riley, salary to date	208 40	
.....	C. W. Murtfeldt, salary to date	116 66	
.....	Various expenses	5 05	
			348 21
1871.			
January 1.....	J. H. Tice, salary	$6 25	
January 11.....	Insurance Exchange, rent to February	41 66	
.....	Gas Light Company	6 42	
January 26.....	W. S. Dyer, expenses to Jefferson City	15 00	
.....	O. H. P. Lear, " "	15 00	
.....	J. W. Harris, " "	20 00	
.....	J. H. Tice, " "	19 50	
.....	N. J. Colman, " "	15 00	
January 31.....	C. V. Riley, salary to date	208 40	
.....	C. W. Murtfeldt, salary and expenses	122 81	
.....	J. H. Tice, salary	6 25	
			476 29
February 1.....	G. W. Kinney, expenses at December meeting	$12 00	
February 3.....	B. Smith, expenses on Railroad Committee	10 65	
February 20....	Insurance Exchange, rent to March 1	41 66	
.....	Gas Light Company	5 85	
February 28....	C. V. Riley, salary	208 40	
.....	C. V. Riley, sundry expenses	6 40	
			284 96
March 1.....	J. H. Tice, salary	$6 25	
March 14.....	Insurance Exchange, rent to April 1	41 66	
.....	Gas Light Company	1 30	
March 31.....	C. V. Riley, salary	208 40	
April 1.....	John H. Tice, salary	6 25	
April 19.....	Insurance Exchange	41 66	
			305 52
April 21.....	C. V. Riley, expenses	$19 20	
April 30.....	C. V. Riley, salary	208 40	
.....	C. V. Riley, for illustrations of reports	500 00	
			727 60
May 1.....	J. H. Tice, salary	$8 34	
.....	O. H. P. Lear, expenses	11 50	
.....	C. W. Murtfeldt, salary to date	383 33	
.....	C. W. Murtfeldt, expenses	69 00	
May 18.....	Insurance Exchange, rent	41 66	
May 31.....	C. V. Riley, salary	208 40	
			722 23

1871.			
June 1	J H. Tice, salary	$8 33	
June 22	Insurance Exchange, rent	41 66	
July 1	J. H. Tice, salary	8 33	
July 13	Insurance Exchange, rent	41 66	
July 31	C. W. Murtfeldt, salary	450 00	
.....	C. W. Murtfeldt, expenses	34 00	
.....	J. H. Tice, salary	8 33	
			592 31
August 11	Insuraoce exchange, rent	$41 66	
September 2	C. V. Riley, salary for three months	625 00	
September 5	J. H. Tice, salary	8 34	
September 15	Insurance Exchange, rent	41 66	
September 30	C. V. Riley, salary	208 40	
...	C. V. Riley, office expenses	10 25	
...	C. W. Murtfeldt, salary and expenses	312 95	
			1,248 26
October 14	J. F. Wielandy, expenses April meeting	$11 75	
October 16	Insurance Exchange, rent	41 66	
.....	Gas Light Company	1 80	
November 1	J. H. Tice, salary two months	16 66	
			71 87
November 11	C. V. Riley, salary	$208 40	
...	Insurance Exchange, rent	41 66	
...	Gas Light Company	90	
November 30	C. V. Riley, salary	208 40	
December 4	J. H. Tice, salary	8 33	
...	C. W. Murtfeldt, salary	300 00	
			767 69
	Total		$5,673 85

JOHN H. TICE.

The Treasurer, Mr. Wm. T. Essex, made the following report:

WM. T. ESSEX, Treasurer, *In account with Missouri State Board of Agriculture:*

Dec. 7, 1870	To balance on hand		$2,341 71
Dec. 6, 1871	To amounts received on appropriations from State		6,000 00
	Total		$8,341 71
	Contra.		
Dec. 6, 1871	By amount of warrants of Executive Committee	$5,673 85	
" "	By balance on hand	2,667 86	
	Total		$8,341 71
Dec. 6, 1871	To balance brought down		$2,667 86

On motion, reports were referred to a committee of Messrs. Harris and Husmann.

Mr. Riley made a statement in reference to the annual appropriation for the office of State Entomologist, obtained from the State, and his personal action in reference to obtaining it.

Mr. Colman offered the following resolution:

Resolved, That the sum of $500 be paid to Mr. C. V. Riley, State Entomologist, to help defray the expenses of illustrating his Third Annual Report, as the sum voted at the last meeting can only be used for his forthcoming Fourth Report.

Resolved, That upon the receipt of this sum, the State Entomologist be required to furnish the Board with electrotypes of the cuts used in said Third Annual Report.

After discussion by Messrs. Colman, Harris, Smith, Mudd and Riley, Mr. Mudd then offered the following, as a substitute:

Resolved, That the State Entomologist be authorized to procure the illustrations necessary for his report, and that warrants be drawn on the Treasurer for the payment of the bills.

Mr. Colman then withdrew his resolution, and Mr. Mudd withdrew his substitute.

Mr. Colman then submitted the following resolution:

Resolved, That hereafter the salary of the State Entomologist be $3,000 annually, and that he be required to furnish to the Board electrotypes of all illustrations used in his Reports.

The resolution was then adopted.

On motion, the Board adjourned.

THURSDAY, DECEMBER 7, 1871.

Board met pursuant to adjournment.

Present—Same as yesterday, except Mr. Husmann, who was absent.

The following additional *ex-officio* members appeared and presented their credentials, and took their seats as members:

E. W. Bishop, President of the Phelps County Agricultural Association;

J. J. Squire, of the Jefferson County Agricultural and Mechanical Association;

A. E. Trabue, of the Ralls County Agricultural Association.

The President called Mr. Harris, Vice-President, to the chair, and then stated that he wanted to make a personal explanation. He then alluded to the report published in the newspapers, that the increase of the Entomologist's salary passed unanimously. He stated that he did not vote for the same, did not sanction it, and was proceeding to state the reasons why he did not vote for it, when Mr. Colman called him to order, as there was no question before the Board.

Mr. Kinney said he voted for it, and now moved a reconsideration, which being seconded, Mr. Mudd then proceeded at length, and stated his reasons for opposing the adoption of the resolution. He stated that the State had appropriated $3,000 for the office of State Entomologist, which he understood to mean for salary and incidental expenses of said office, and the Board had to account to the State Auditor for its expenditure. The incidentals are, illustrations for reports, rent, and other office expenses. Now, he was disposed to act with the utmost

liberality compatible with the public interest, as to the salary of the Entomologist, toward whom he entertained the kindliest and warmest feelings, and he would concede him the entire balance of the State appropriation, after the deduction of the incidental expenses, even excluding the rent. To make the report intelligible, it was necessary to have cuts made of the insects described, and of their transformations. Last year the Board had appropriated $500, to be paid the Entomologist for this purpose. He then opposed the proposition, not for what it appropriated, but for the form in which the appropriation was made. He at that time took the ground that the necessary cuts should be made, and that the regular bill of costs of same should be audited and paid like all other bills of expenditure. But to appropriate a sum to the Entomologist, without specifications and restrictions, he then said, was an indirect way of raising his salary. But the resolution now under discussion is more objectionable. It appropriates the whole amount, without saying anything of illustrations.

Mr. Colman—It is understood that the Entomologist is to have the engravings made at his own expense.

Mr. Mudd—I know it was so stated when the resolution was up, but it is not so expressed, and, as the resolution now stands, we have no right to demand it of Mr. Riley; and if we make an order for illustrations, we will be bound in law to pay for them out of our other fund.

Mr. Colman then asked for the ayes and noes, which proceeded until the names of the *ex-officio* members were called, when Mr. Colman raised a point of order, whether the *ex-officio* members were entitled to vote upon such questions; upon which a long debate ensued, but it seemed to be the unanimous opinion of the members that they were entitled to vote. It was then demanded of Vice-President Harris, occupying the chair, to decide the point of order.

Mr. Harris said it was clear to his mind, from reading the organic law establishing this Board, and of the rights and powers of *ex-officio* members, as therein defined, that they had a right to vote upon any and all questions that properly came before the annual meeting.

Mr. Colman then raised the point of order that a question to raise salaries was not a proper subject to come before the annual meeting.

Considerable debate ensued upon this point, but before it was decided, Mr. Colman moved that the whole subject be indefinitely postponed, and demanded the ayes and noes upon the question of postponement, which resulted as follows, *ex-officio* members declining to vote:

AYES—Messrs. Colman, Essex, Harris and Stark.

NOES—Messrs. Kinney, Mudd and Smith.

So the question was indefinitely postponed.

Mr Harris, from the committee to which were referred the reports of the Executive Committee and the Treasurer, made the following report, which was accepted and adopted:

MR. PRESIDENT: The committee to which was referred the Treasurer's account, beg leave to report that they have examined the same and find it correct, the vouchers corresponding in date and amount, as per report of the Executive Committee.

J. W. HARRIS, *Chairman.*

Mr. Murtfeldt, in behalf of the committee to examine vineyards, and award the premium offered by the Board, made the following report, which was accepted:

To the Honorable the State Board of Agriculture:

MR. PRESIDENT AND MEMBERS OF THE BOARD: Your committee, who were charged with the duty of visiting the several vineyards entered for competition for the premium of fifty dollars, offered by this Board for the best vineyard, beg leave to make the following report:

August 17th, they visited the vineyard of Dr. H. Clagett, near the station of Gray's Summit, Franklin county. Found the vineyard, upon the whole, promising, but marred occasionally by an experiment of non-cultivation. The soil is well adapted to the growth of the grape—exposure to the south; the system a four-wire trellis, and a modification of the horizontal arm and "Thomery." The dominant variety is the Concord, and next in order the Norton; other varieties cultivated are the Taylor, Ives and Clinton. All of the last-named varieties had suffered more or less from the gall-fly and thrip. Found quite a number of bunches of green and immature grapes; showing imperfect summer pruning and after-culture. Quantity of good fruit fair, and quality good.

Dr. Clagett kindly took your committee into his buggy, and proceeded to the next vineyard, that of Chas. Paffrath, distant about twelve miles, and in St. Louis county.

In Mr. Paffrath's vineyard, or rather vineyards, for there are three several plats and plantings, great pains had been taken in the preparation of the plats, especially with the youngest vines, now bearing for the first time. The variety grown is the Concord. In the opinion of your committee, the vines are planted too close, both as to rows and to the distance apart in the row, in the oldest plat. All the ground had recently been plowed, and showed very clean culture during the season. The vines are trained on a four-wire trellis, and on the *fan* system nearer than any other. Almost every vine was intact, and there was plenty of good fruit; most of it had been marketed, and at satisfactory prices. On the oldest vines, fruit ripened irregularly. Foliage dense and healthy, showing considerable late growth.

Your committee were hospitably entertained for the night, and, after a second careful survey of the vines on the morning of the 18th, taken to the nearest railroad station.

The next visit was made to the vineyard of J. H. Spalding, August 18th, situated near Rosehill, St. Louis county. It contains one and one-half acres. The elevation and exposure are very favorable. The variety grown is the Concord. Your committee never saw the training of vines on the horizontal arm system more perfectly carried out than here. This vineyard had suffered some from a hail-storm, yet there was plenty of good fruit, much of which had been marketed, and sold at fair prices. Culture had been clean, and not of recent date. Foliage rather deficient. Age of vineyard, four years. Trellis, four wires, and posts eighteen feet apart. It promises to be a source of pleasure and profit to its owner.

On the same day, (August 18th,) your committee also visited the vineyard of H. W. Leffingwell, situated in central Kirkwood, St. Louis county. This is one of the finest and best vineyards in the State. Here we found a most substantial trellis, made of cedar posts, a slat top and bottom, and three gutta percha covered copper wires. Nothing could be more substantial or beautiful. Yet your committee must consider this trellis, as far as the wire is concerned, incidental; its costliness will prevent its general introduction.

The variety of grape cultivated is the Concord. There was plenty of good fruit, and well distributed over the vines; foliage good; culture clean, and evidently pursued up to very recent date. The training was on the horizontal arm, but in the opinion of your committee, the system had been adopted one year too late; it has been fairly carried out since then.

J. J. Kelly's carriage conveyed the owner of the last-named vineyard and your respective committee to the vineyards of said Kelly, situated near Webster Grove, St. Louis county, in the afternoon of the same day (Aug. 18.)

The leading variety of grape grown by Mr. Kelly is the Concord; next in extent is the Catawba, which, notwithstanding its precarious health and more difficult cultivation, the owner of this

vineyard has not yet abandoned, because here it has proven a very profitable sort, especially for the last three years. Other varieties of grapes are cultivated, but were not offered for competition. The Concords were the finest yet seen; bunches large and perfect, and well and evenly distributed on the vines; foliage healthy and abundant, thus securing the perfect ripening of the fruit; cultivation thorough, but not recent; grounds clean; no unripe grapes of second crop; exposure, a gentle slope to the south. With the Concords, the horizontal arm system on a four-wire trellis was pursued. The Catawbas were trained to two stakes. The fruit of the latter variety was nearly ripe at the date first above written.

In consequence of want of facility for speedy communication with Mr. Kinney, chairman of this committee, the vineyard of Eugene Consigny, situated four miles from Hematite, in Jefferson county, was visited only by Chas. W. Murtfeldt, as committee. Had it been discovered that there would be a chance for successful competition on the part of Mr. Consigny, Mr. Kinney would no doubt have also visited the vineyard.

Mr. C. designs to devote his energies to the cultivation of small fruits, but especially to grapes. His lands are well adapted to the purpose, as was evidenced by the fact that the grapes (first crop) had matured early, thus finding a ready and good market. Mr. C. proposes to himself the problem of putting none but the best of fruit on the market, exercising extreme care in selection and packing. At the time of the visit, (last week in August,) fruit nearly all sold; quality very good. Only about one-half of vineyard old enough to bear. No particular system of training had as yet been adopted; the canes were simply tied to single stakes. Tillage thorough and clean; foliage healthy and abundant, with plenty of strong new canes for next year's fruiting. Mr. C. hardly expected to be successful in this competition, and, in his modesty, places himself in place of a learner.

Your committee, in conjunction with the *ad interim* committee of the State Horticultural Society, visited the vineyard of Col. Charles McLaren, near Baden, St. Louis. This vineyard contains about ten acres, in two adjoining plats, of five acres each. The leading variety cultivated is the Concord, which was this season bearing its first crop. The system of training is the *fan*, on a wire trellis; at least it is nearer that than any other. The vines looked healthy, fruit good, and a moderate crop, except where the effects of the late frost (April 17) could be traced. Culture thorough and clean; altogether a fine and promising vineyard.

By special request of the Tainter Bros., your committee deferred their visit to this vineyard, near Hermann, Gasconade county, until September 8th, because the leading variety cultivated (Catawba) would be nearer or quite ripe at that date, and also because the fair of the Gasconade County Agricultural Society would be held at that time. Arriving at Hermann by the night express train, we were taken to comfortable quarters, and inspected the vineyard on the following morning. The main Catawba vineyard has been planted many years; it has a good exposure, had received fair cultivation, and produced a medium crop of fruit, at that date nearly ripe enough for the press. Foliage rather thin and deficient, with very little new bearing wood; the trellis consisting of two wires and small posts —— feet apart; had seen considerable service.

A small plat of Concord vines on the bluff seemed more vigorous, and had evidently yielded a good return of very good fruit, judging from one row which had been left intact for our special inspection.

Having thus discharged the duty imposed upon us, and duly considered the statements of the competing parties, respectively, which are herewith submitted, your committee beg leave to recommend that the premium of fifty dollars be awarded to Mr. J. J. Kelly, of Webster Grove, St. Louis county.

All of which is respectfully submitted, by

GEO. W. KINNEY,
CHAS. W. MURTFELDT, } *Committee.*

Report of the committee was adopted without a dissenting vote.

On motion, the award of the premium made by the committee was approved, and it was ordered that the Executive Committee be instructed to issue a warrant for fifty dollars to J. J. Kelly, the amount of premium offered by this Board, by resolution adopted on the 29th of April, 1871, for the best vineyard.

After an irregular debate between Mr. Colman and Mr. Murtfeldt, which terminated by the President declaring it to be out of order;

Mr. Harris moved that the Board proceed with the regular order of business.

The President stated the regular order of business was the hearing of the essays upon the subjects designated by resolution of the Board at its meeting in April last, unless there were other reports from committees; or unless the Board, by special order, would proceed and deliberate upon the agricultural wants of the State, and agree upon what legislative measures were necessary to promote the interests of agriculture. He said bills for a dog law and a stock law were still pending before the Legislature, and it might be of interest and service to bring these subjects more prominently before the people of the State.

Mr. Harris said some of the essays would bear upon those very points, and therefore he wished to hear them first.

It was then ordered that the essays be read in the order in which they stand on the list, as adopted April 29, 1871—the first essay being on stock for special purposes, etc., by Col. Colman.

Mr. Colman said he had not prepared any paper, but if the matter would be laid over for the present, he would give his views orally at any time it would be called up.

Laid over accordingly.

The next essay in order was, that on swine, by Mr. Essex.

Mr. Essex said he was not present when that subject was assigned him. If he had been, he would have protested against it, for the reason that he had almost no personal experience in raising hogs. If, therefore, under the circumstances, he had prepared an essay, it would have been merely a repetition of what others had said before, and said better than he could say it. His better judgment, under the circumstances, told him it would be wisdom to decline the attempt; and, therefore, with regret, asked to be excused.

The next essay was that on sheep.

Mr. Kinney then read an essay.

Mr. Kinney, being asked to state what his recommendation about crossing would be, stated he would like a cross between Southdown and native stock. Had such sheep on his farm, and thought them more valuable and even superior to pure bloods, and so also a cross between the Merino and native. He thought, to meet all demands, a combination of all was desirable.

Mr. Harris most heartily indorsed the general views of the essay. While he always kept some pure stock on his farm, and valued it highly, yet he believed that when all the purposes are regarded for which sheep are raised, mixed breeds were the best and most profitable. Sheep are raised for wool and for mutton. Wool has to be of different grades and quality, to meet the demands of the market. Different breeds, bearing the respective kinds and quality of wool, had therefore to be raised. Besides, there is the demand for mutton;

not every breed meets the requirements of taste in that respect. In fact, most of the finer breeds are poor mutton sheep. Then, constitutional vigor and hardiness also have to be considered. He, therefore, for general purposes, preferred mixed breeds of Cotswold, Merino, Leicestershire, and the common stock, according to the special purposes desired.

Mr. Colman said, for general purposes, the suggestions were all very good, but he wished to say a word in regard to purity of breeds. Successful breeders had devoted their life-time to the development of those particular breeds for particular purposes. He had made large sales of stock this year, and had been asked particularly in regard to pure breeds. The sheep breeders of Kentucky, Ohio and the Eastern States had amassed fortunes by keeping their breeds pure and unmixed, and thus supplied the demand for highly improved sheep. A farmer, by keeping the fine breeds pure, could make ten dollars where otherwise he could not make one by mixing them. The breeders of sheep in this country should pay more attention to purity. There was no State in the Union so admirably adapted to the raising of some sheep as Missouri, and there was no other branch of husbandry so profitable as the raising of sheep. Those pests of the farmer, the dogs, were to be found in every neighborhood, and were the bane and the destruction of sheep profits.

Mr. Squire said this was a subject of great importance; and when the American people once understood sheep husbandry well, and met its requirements, they would find it the most profitable branch of agriculture. He was born in the country where these famous breeds originated, and knew how great care was taken to keep the breeds pure and from deteriorating. Every animal must have all the points of its kind perfect, or it is discarded for breeding purposes. Bucks have to be inspected and examined by experts before they can be hired or sold. There are generally no less than one hundred head assigned to one shepherd, but if there are a thousand, they are divided into separate flocks. Ground is kept entirely free of weeds, so that the wool may be clean. Grain is considered too heating, therefore turnips are raised and areas inclosed by hurdle fences, until the sheep have eaten the turnips clean. He then referred to the wool market in England, where every bale is opened and thoroughly inspected, etc.

Mr. Bishop indorsed every proposition of the essay, even that declaring sheep raising to be a profitable branch of husbandry. But here was the rub; the dogs come in, and not only eat up the sheep, but the profits. No portion of the State is naturally better adapted for sheep raising than the southern portion, in which he lived; yet, on account of the depredations of dogs, it could not be made a paying business there, unless herded by day and securely inclosed by night. This was too expensive, unless the herd was large enough to justify the employment of a shepherd. He gave his own experience and the

experience of his neighbors in attempting to introduce this important branch of industry in South Missouri, and invariably their efforts were frustrated by the rapacity of dogs. The conclusion was, it was trifling away money to pay fifty or one hundred dollars per head for pure blood of the choicest breeds, and expose them, as they were obliged to do by day and night, to the risk of being killed by the dogs. He was certain nothing would or could be done in his part of the State, either for advancing this branch of industry, or for improving the breeds, until farmers were better protected against the prowling depredations of two thousand or three thousand worthless curs in every county in the State.

Judge Bailey concurred with the sentiments, both of the essayist and of Mr. Bishop. The effectual remedy is, to have a stringent dog law. But if we can not get that, the only way to multiply the number of sheep in the State is, to diminish the number of dogs in it—killing every prowler wherever found, unless accompanied by his owner. He had suffered serious losses repeatedly. In one case he caught two dogs in the very act, having killed several of his most valuable sheep. One of the dogs he killed on the spot, and the other he followed home to town, and told his owner that he had caught him killing his sheep, and demanded of his owner to kill him, or that he would do it for him. The owner hesitating, he shot the dog on the spot, and went to the mayor and gave himself up for violating the ordinance against shooting within the corporate limits, and also to answer the charge for killing the dog. But he was never prosecuted for doing either.

Mr. Stevens expressed cordial indorsement of the views contained in the able essay. That essay, and the facts elicited by the discussion thereon, ought to awaken the people to see their own interest. Sheep raising was an essential business to the comfort, prosperity and happiness of the whole community—both food and raiment being involved in it. It was an undeniable fact, that the only obstacle to its success was the existence of a few thousand worthless curs, which greatly interfered with its profits everywhere, and in some localties made it a ruinous enterprise. The whole community is interested in the question of cheap food and cheap clothing; and it should make common cause with those who are endeavoring to abate the dog nuisance.

On motion, the Board adjourned to half-past two o'clock, P. M.

AFTERNOON SESSION.

The Board met pursuant to adjournment.

Present—Same as in the forenoon.

Mr. Essex stated a wish that the regular order be suspended, for the purpose of taking up special business that had to be transacted some time during the session.

On motion, the order of business was suspended accordingly.

Mr. Essex said the special business which he wanted to bring to the attention of the Board was this:

At a late meeting of the Board of Curators of the State University, the subject of the employment of the Superintendent of the Agricultural College Farm was up for discussion, and was finally disposed of by referring it to the members in the Board of Curators who are members of the State Board of Agriculture. The reference contemplated that the Board of Agricultural Curators would report by recommending a suitable person, and also what compensation he should receive. As they were representatives of the agricultural interests in the said Board of Curators, he thought it entirely proper that the matter should be brought before this Board for advisement. He thought it not only a proper subject for the calm deliberation of this Board, but, from the wide difference existing in the minds of the other Curators, one of urgent necessity, upon which the success, efficiency and prosperity of the agricultural department of the University depended. We wanted a good, competent and expert agriculturist for Farm Superintendent, or none at all, and no such man could be induced to leave a farm for a situation worth only from $600 to $700 per year.

Mr. Kinney said he attended the last meeting of the Board of Curators, when Mr. Essex and himself were the only members present representing the State Board of Agriculture. He thought, from the proceedings then had, that the Boone county members and the people of Columbia had lost sight of, or were overlooking the interests of the Agricultural College, especially as far as the farm was concerned. They were much more anxious about, and had their attention more occupied with, the projected Woman's College, than with the Agricultural College. Consequently he thought that the interest of the latter was in danger of suffering, unless closely looked after by the representatives of the agricultural interests of the State. He looked upon the position of Farm Superintendent as being of fully as much if not of more importance than that of any other professor. He should be a competent man in every department of farming, scientifically as well as practically. In conformity with these views, he had introduced a resolution in the Board of Curators, that the Farm Superin-

tendent should receive the same salary, and hold his office by the same tenure, as any other professor in the institution; whereupon one of the local Curators stated that a good Farm Superintendent could be got for $600 a year, though he could not spell "baker." At any rate, it would be the extreme of liberality to offer a salary of $1000 or $1200 for a Superintendent.

Mr. Colman suggested the name of Mr. Kinney for the position.

Mr. Kinney said under no conditions would he take it. The same position had been tendered him in the Agricultural College of Kansas, at Manhattan, which he declined, though the salary was $2500. If we do not wish to lose character and standing amongst the State Agricultural Colleges, we must look for men of the same high attainments, and pay them as liberal salaries.

Mr. Essex said he wished to offer one word of explanation. The matter was referred to them, by the Board of Curators, for examination and report. But thinking the matter of such vast importance, after consultation, Mr. Kinney and he had decided to bring it before the Board for deliberation and instruction.

Mr. Colman said he would be brief in the remarks he was about to make. It was true, as had been stated, that a Farm Superintendent who could not spell "baker," could be got for five or six hundred dollars. But the day of mere physical farming had passed away. The day when nothing but physical labor was employed in carrying on the operations of the farm had gone by. The brain had taken the place of muscle. Mind was as valuable on the farm as at the professor's desk, in the mercantile establishment, in the editorial room, or anywhere else; and if they wished the Agricultural College to take that high and commanding position which its friends intended it shall assume, they must obtain something more than a physical machine to carry on the physical operations of the farm. They must take a man of finished education, educated thoroughly in agricultural pursuits, in botany, chemistry and geology; understanding fully about animal physiology, knowing all about the breed of animals, the proper system of the rotation of crops, and everything of that kind, in order to teach those who graduated at that institution the science as well as the art of farming. They would have to give him the same salary, the same respect and honor, that any professor in the college received. The farmer, educated, respectable, patriotic, was the lord of creation. There was no higher profession known to civilization than that of the farmer who properly understood his calling. He offered the following resolution:

Resolved, That in the opinion of the State Board of Agriculture, the Superintendent of the Agricultural College should be entitled to receive the same salary that the professors of the State University receive.

The resolution was adopted unanimously.

On motion of Mr. Essex, a committee, consisting of Mr. Colman and Mr. Kinney, was appointed to report this action to the Board of Curators.

The Board then proceeded to the regular order of business—the reading of essays on the subjects assigned.

The next essay in order was:

"Meadows; How to Make and how to Improve them." By Judge Moore.

Judge Moore not being present, and not having sent in an essay, it was passed over.

The next in order was:

"Manufactures, as Connected with and Benefiting Agriculture." By George Husmann.

Mr. Husmann being temporarily absent, the subject of his essay was passed over for the present.

The next essay on the list was:

"Rural Architecture and Adornment of Country Homes." By B. Smith.

Mr. Smith said, for the first time he must plead guitly of remissness, and if the Board would excuse him this time, he would promise faithful compliance hereafter.

Mr. Harris said he found his turn next on "Farms: The best method for the Farm and Farmer."

He had overlooked the matter until a late date, and then found it so vast and comprehensive, as well as important, that it required more time than he could command to say what should be said for the edification of the public. He regretted that he had to ask the indulgence of the Board for not meeting its expectations in the matter.

The subject of the next essay was the "Honey Bee: Will it Pay?" By L. C. Wait.

Mr. Wait not being present, an essay, written by him, was read by Mr. Murtfeldt.

[See Essays.]

Mr. Smith being called on as an eminently proper person to discuss the question, said he always had a fondness for the bee, and ever since he owned anything always owned more or less colonies of these busy little fellows. So great was his fondness for them that some of his witty friends had proposed to change his name from B. Smith to *Bee* Smith, and he guessed that was what they meant by saying he was an eminently proper person to discuss this subject. He said sometimes he had owned over a hundred colonies, and with proper care, and providing for them during midsummer and early autumn with pasture, found that they could be made very profitable, though there were many drawbacks from moths. He then gave his experience with them, mode of treatment, wintering hives, etc. He also described a bee-house of Mr. Mudd, which he said was the most complete thing of the kind he had ever seen, and answered the purposes

most admirably, of protection from moths, mice, summer heats and winter frosts. He also gave his experience with the Italian bee, which he considered far superior to the common bee in vigor, hardiness and productiveness, since it will extract honey from tubular flowers that the common bee cannot work on. The Italians are a race of aristocracts that do not associate and mix with the common race. Thinks they have greater energy, work later and earlier, and are not so much disposed to sting as the black bees. They will drive black bees from a comb, but otherwise have a high moral sense, as he never knew them to rob.

Mr. Harris asked Mr. Mudd how he transferred the bees in his bee-house?

Mr. Mudd then said each colony had a separate apartment of its own. He then explained its structure and the mode of transfer, which it is to be regretted were not reported.

Mr. Stark said he had no essay ready on his subject, "Orchard Culture," but would try and prepare a paper on the subject in time to go into the printed report.

Neither Dr. Dyer nor Mr. Wielandy present, consequently their subjects were passed over.

Mr. Murtfeldt then read the following essay on "Blue-grass: The Best Manner of Sowing it and Perpetuating it for Pasture." By O. H. P. Lear.

[See Essays.]

Mr. Harris said that for early spring, late autumn and winter pasturage, blue-grass was without a rival. If the pasture has a good coat of grass on when winter sets in, all kinds of stock will do well on it, without other feeding, during winter, while the ground is not covered with snow. Its nature of growing at any temperature above the freezing point enables it to grow during warm days in winter, and brings it forward rapidly in spring, in advance of all other grasses. Its only drawback is, it cannot stand drouth, and in July and August it parches up entirely, but immediately comes forward when the rains return. Its impatience of drouth imposes on the farmer the necessity of providing a substitute for it for two or three months in summer, which, however, is easily done. In sowing it, his custom is to mix the seed with clover and timothy, which occupy the ground until, and generally run out by the time, the blue-grass is fully established, which is from two to three years.

Mr. Colman—I agree with Mr. Harris as to the nutritious quality of the blue-grass, and as to its value for early and late pasture; but it is a poor grass in a dry summer; cannot recommend it for summer pasture, because it cannot be depended on; for summer pasture depends upon orchard grass and clover, which send their roots deeper and resist drouth better.

Mr. Harris—I have tried orchard grass some, aud though much inferior to it, it is the best substitute I know of for blue-grass dur-

ing the summer heats. He also stated he experienced a good deal of trouble in his blue-grass pastures from the white grub and moles. As blue-grass delights in a compact soil, he found the roller and the tramping of stock to be effective in checking these pests.

Judge Bailey fully agreed with Mr. Harris about orchard grass, and was convinced that stock would not feed on it as long as they could get blue-grass. Has visited the blue-grass region in Kentucky, and observed the manner of treating pastures there, which secured a good pasture the year round. His experience was that timothy, if rightly treated, would afford a good pasture during summer, when the blue grass was likely to fail from drouth; and stock liked timothy equally as well as blue-grass.

Mr. Tice said, in Eastern Pennsylvania, where he was raised, *Poa compressa* was known as blue-grass, on account of its blue color, and *Poa pratensis* (Kentucky blue-grass) was known as meadow grass. Farmers there valued the former much higher than the latter, because it is equally luxuriant in growth, considered more nutritious, and will withstand any amount of drouth. He had often seen it grow in the mortar on old walls. Under favorable circumstances it will grow so compact that it blanches underneath, and when cut with a scythe it will hang together like a fleece. He thought experiments ought to be made with it in the West, and probably it will be found to fill the gap between the spring and fall growth of the Kentucky blue-grass.

Prof. Riley, the State Entomologist, then read a paper on the Colorado potato bug, which will be found in the report of the State Entomologist.

Mr. Tice said it was singular that this insect had so multiplied in the Valley of the Mississippi as to have become a dreaded scourge, while in Colorado, where tradition has fixed its origin, it is unknown to nine out of ten agriculturists. The potato crop there has never been attacked by it. He saw but a single bug while in the Territory. I found it on Castle Butte, just east of Golden. It was feeding on the *solanum rostratum*, which resembles our *solanum carolinensis*, or horse nettle, very closely, except that it is more dwarfish, more spiny, and has a brilliant yellow bloom. I have the plant on which I found the bug in my herbarium.

The board then adjourned, to meet again on to-morrow morning at 9 o'clock.

FRIDAY, DECEMBER 8, 1871.

The Board met pursuant to adjournment.

Present—As yesterday.

The President stated that at the request of the Chief of the Signal Service, during the summer he had appointed Messrs. J. H. Tice, Geo. W. Kinney and Chas. Peabody a committee on Meteorology, to devise measures, if possible, to make the meteorological observations of the Signal Corps available to the agriculturists. He understood that Mr. Tice had prepared some resolutions for the action of the Board, which would now be read, if there were no objections.

Mr. Tice then presented the following preamble and resolutions:

WHEREAS, The General Government has organized, for the benefit of commerce and navigation, a Signal Service Corps, and established stations along the Atlantic and Gulf coasts, the shores of the lakes, and at a few points in the interior of the continent, for making certain meteorological observations, namely: Changes of atmospheric pressure, of temperature, and of humidity; the direction, velocity, pressure and force of the wind; cloudiness, rain-fall, etc.; and

WHEREAS, From these data the Bureau makes up a forecast of the weather for the ensuing day, and orders signals of caution and warning to be hoisted along the coast and shores when dangerous storms are approaching; and

WHEREAS, These forecasts are generally verified with remarkable accuracy, and the mariner, forewarned of danger, either avoids it or prepares to meet it, thus saving millions of property from shipwreck or destruction, which otherwise would happen; therefore, be it

Resolved, That the interests of agriculture would be promoted by extending to it the benefit of the observations of the Signal Corps, and that this Board most earnestly recommends to the General Government the enlargement of the area and the sphere of these observations, by extending the system so as to form a net-work of stations at all eligible points from the Atlantic to the Pacific coast, and from the lakes to the Gulf of Mexico.

2. That, in addition to the signal stations for observing the ordinary meteorological facts and phenomena, as now conducted, the interest of science, which is the handmaid of modern civilization, demands the establishment of physical observatories at all suitable points throughout the globe, and their equipment with all the necessary instruments for observing and recording the changes of tension of all the physical forces, and likewise for telescopic and spectroscopic observations of the sun and stars. This Board therefore urges upon the National Government the establishment of such institutions at all points necessary to obtain uninterrupted observations within our own territory; and that it use its influence with all civilized and enlightened nations to establish similar institutions within their bounds, making the same international establishments for the benefit of science, and the enlightenment of all nations, by an interchange of the observations made, thus covering the entire globe by the system, and bringing under constant and unremitted observation all meteoric changes, as well as disturbances of the sun, of the earth, and its atmosphere.

3. That at these international observatories, in addition to making such special observations of meteorological changes as are necessary to forecast, with approximate accuracy, the weather that will prevail for the ensuing twenty-four hours along certain latitudes and in given longitudes, both on land and at sea, a higher grade of general observations should be made of all physical phenomena, electric and magnetic, telescopic and spectroscopic, and carefully noting all solar and telluric perturbations, the time of the occurrence of each, so that if there exist any connection or interdependence between them, the fact may incontrovertibly be established, the unity of cause in all physical phenomena ascertained, and the laws and forces determined by which the universe is governed.

4. That meteorology now is a mass of conglomerate, loose, incongruous and disjointed facts, and that it must remain so as long as the physical facts of the universe are not carefully and exhaustively observed and accurately recorded; for meteorology can only be systematically constructed into a science when universal laws and incontestible truths have been disclosed by studying its elements in the facts of nature, accurately classified and collated.

5. That, though a partial benefit will result, yet a general benefit cannot accrue to agriculturists by furnishing them forecasts of the weather for a day in advance, because it always will be impossible to reach the masses in time to be of any service. But by collecting the facts and materials out of which to construct meteorology into a positive science, the popular mind can receive such training and education as will enable every one to forecast the weather with sufficient accuracy to answer individual purposes.

6. That this Board recommend to Gen. A. J. Myers, the head of the Signal Service, the convention of the members of the meteorological committees of the several States, as far as appointed, and other scientists, for consultation, and for maturing such plans, and adopting such measures, as will secure the objects contemplated in the foregoing resolutions.

REMARKS OF MR. TICE.

On presenting the above resolutions, Mr. Tice made the following remarks:

MR. PRESIDENT: As Chairman of the Committee on Meteorology, I submit these resolutions as embodying the views of the committee. We have had no correspondence with General Myers, the official head of the Signal Service, and only know his views by the circular forwarded to the committee. The original design of establishing a Signal Service corps was for the benefit of commerce and navigation. The warnings it is giving of approaching storms, and its forecasts of the weather, have been and are so remarkably accurate, that millions of property are annually saved from shipwreck on the lakes and Atlantic sea-coast, by having timely notice to prepare for meeting the gale, or to take measures for avoiding it.

But ships and their cargoes are not the only property exposed to the sport of the elements, and in danger of being destroyed by them. In harvest time, the grain, and especially the hay crop, may be seriously damaged or totally ruined by a rain storm, which damage the farmer could avoid, had he timely warning of its approach, a few hours in advance of its advent. The idea, therefore, of making the operations of the Signal Service likewise available for the interest of agriculture, is a natural expansion of the original idea. At the earnest solicitations of agriculturists, General Myers promptly tendered the services of the Signal Corps to the agricultural interests of the country, as soon as a feasible plan to make the services available could be devised and matured.

The circular to us says: "Independently of the plans for the future, not immediately practicable, but proper to be considered with reference to enlarged facilities hoped for, this office would be gratified to receive any suggestions from your committee as to further utilizing those now existing." Your committee do not think that anything practical would come out of the suggestions of forty different committees, looking at the matter from forty different stand-points, and under about as many different circumstances and conditions. The

best informed of these committees know little of the organization and less of the workings of the bureau, or of its facilities and ability for transmitting information to points where farmers could avail themselves of its benefits. These committees are fully aware that if it were possible to lay every morning at each farmer's door, a bulletin of the condition of the weather, and a forecast of what it will be during the day, nothing more could be desired; but even the least informed knows that this is impossible. In large cities, where, however, farmers do not live, the daily papers publish these bulletins, and there is a general dissemination of this information; and along lines of railroads radiating from such cities, the intelligence can be spread in time to be of service, say to the extent of fifty or one hundred miles. But by this means but an insignificant fraction of the agricultural community can be reached. To the extent that this can be done, it will be a vast benefit, and will popularize the bureau; but men uninformed of its facilities and workings are not prepared to give valuable suggestions that will aid in giving greater extension to its benefits. The present organization and workings of the bureau may admit of engrafting upon it a feasible plan for the dissemination of the desired intelligence far and wide, which, with proper arrangements to be made by farmers, may be made to reach remote settlements; but evidently this can only be done by a mutual understanding between all parties concerned—the bureau explaining what it can do, and the farmers agreeing what they will do. To effect this, there must be a mutual interchange of views; your committee, therefore, present a resolution recommending to Gen. Myers the calling of a convention of the agricultural and meteorological committees of the different States, for consultation, and for devising measures and maturing plans for effecting the object contemplated.

For the purpose now aimed at, namely, furnishing to navigators of the lakes and along the Atlantic coast information of the approach of storms, it is only necessary that the stations extend far enough west to where the storm is on the previous day. In our latitude, in fact within the territorial limits of the Union, except a narrow strip along the Gulf and South Atlantic coast, all storms come from the West. From the Mississippi River to the Atlantic Ocean, their rate of motion is about thirty miles per hour. From the Pacific coast, when they come that far, their rate of eastward movement is about eighteen miles per hour on an average, though much retarded while crossing the mountains. The forecasts of storms, therefore, are made up mainly from the meteorological conditions observed by the trans-Mississippi stations—for instance, St. Paul, Omaha, Leavenworth, St. Louis, Shreveport and Galveston.

There are but three stations west of Omaha, all on the line of the Union Pacific Railroad, namely: Cheyenne, Corinne and San Francisco; but the bulletins never speak of them. To benefit agriculture, the number of western stations must be multiplied, and have a longi-

tudinal as well as a latitudinal direction; and especially should they be extended along the crest of the Rocky Mountains. From my personal observations there, I am satisfied that the mountains have an immense modifying effect on the meteorology of the plains along their eastern base, and consequently upon the meteorology of the Mississippi valley and Atlantic slope. Moreover, there is an important phenomenon on the plains that must be thoroughly observed and investigated, before the meteorology of the eastern half of the continent can be understood, and the probable changes in the weather forecast with approximate accuracy. I allude to the current of air, almost a continuous gale, that blows on the plains parallel to the mountains, six months to the north in summer, and in winter six months south.

For some two months in summer, on an average, on one day in seven, it is a sirocco, heated as though it came from a furnace; and for eight weeks after mid-winter, an intensely cold arctic blast, once in seven or eight days, sweeps over the plains south, which can be faced by neither man nor beast. We know the mechanical causes of these periodic winds there, namely: low atmospheric pressure in the upper Missouri valley, and relatively high pressure in the Gulf of Mexico during summer, and the reverse conditions in winter. But what is the physical cause of these alternate semi-annual high and low atmospheric pressures at the designated points? And why should these points be so located that they produce always motion parallel to the mountains? Then, again, it is almost certain that in the axis of these periodic winds originate nearly, if not quite all, the local storms that sweep eastward over the Mississippi valley. Now, what are the peculiar meteorological conditions of the belt swept by these winds, when it becomes the digester of storms. No one can answer now, because no observations have been made to ascertain the facts; yet until they are known we will grope in the dark, while endeavoring to unravel the tangled thread of meteorological science, as applied to the center of our continent.

From this fact alone, it is evident that but little benefit would accrue to agriculturists in the eastern half of the Union, even if, as the circular issued from the Signal Bureau says, "the facilities now existing were fully utilized." More facts must be collected, and these can only be collected by establishing stations for observing them where they exist or are constantly taking place. From this it follows that our whole territory must be covered by a network of meteorological stations. Then, in order to have a complete system of observation, embracing not only the earth and its atmosphere, but the sun, the ruling or controlling body of our system, we must have physical observatories so placed as to secure uninterrupted observation of the sun while above the horizon. At no time is our whole territory under a cloud. When the clouds hide the sun in the valley of the Mississippi, generally it is clear on the Atlantic slope, and generally clear

on the Rocky Mountains and the Pacific coast; and while the sky is overcast at those points it is clear in the Mississippi valley. The Rocky Mountains are famous, not only for their generally cloudless skies, but for the transparency of their atmosphere. These observatories, therefore, should be so distributed over our territory from east to west, and from our northern to our southern border, as to secure always at some point a cloudless sky for making observations. If the government took the matter in hand, it might make existing institutions generally available, by merely furnishing the instruments and paying the observers.

This is an undertaking that lies entirely beyond individual enterprise. To accomplish anything, the observations must be made systematically and according to a definite plan. Consequently it must have a responsible head to direct it, as well as sufficient means to defray the expenses. But these observations should be carried on around the globe, and in both the Northern and the Southern hemispheres; consequently it must be done by concerted plan of operations between enlightened nations. And again, on whatever else different nations may desire to make observations, the observations must be so conducted as to note all the facts and phenomena that are embraced in the general plan.

This will not be as difficult of accomplishment as may be supposed at first. Russia has now physical observatories, extending from the Baltic through Siberia to the sea of Ochotzk, where electric, magnetic, thermal, barometric, hygrometic, etc., observations are daily made. Germany, and several other of the principal nations of continental Europe, have theirs. England has them, both at home and in Hindostan and Australia. In fact, the greatest difficulty in the enterprise will be to enlist our own government in the cause.

The preamble and resolutions were then adopted.

Mr. Murtfeldt then read an essay on "Manufactures connected with and benefiting Agriculture."

Mr. Smith said, in connection with manufacturing came up the raising and utilizing of sumac, not only as a mordant in dyeing, but for tanning. It now grows wild in immense quantities, and it might be a profitable crop to cultivate. It could readily be propagated from roots and cuttings.

Mr. Husmann said there is no trouble in raising it, nor in getting a plantation of it. If a few plants take possession of an old field, just stir the soil. The more you break the roots, the thicker will be the stand, and the more luxuriant will be the growth. But is there a market for it?

Mr. Smith said yes. In his section, country store-keepers advertise for it, and it is gathered by women and children, who trade it to the merchants, at rates that pay them well. Merchants sell it to tanners; as it contains a large amount of tannin, it is a most valuable

article for tanning. There are several varieties of it, but the best variety had large red berries with a sour taste. It was also the most common variety, and of the quickest growth. The leaves of old bushes only are gathered, but young, succulent shoots could be mown like grass, and the whole used.

Mr. Murtfeldt said there was no difficulty in selling it. It was already an article of general commerce, and was largely imported into this country, to supply the manufacturers.

Mr. Squire said the finest vinegar could be made from the berries of the variety described by Mr. Smith. Their juice was pure, acetic acid.

Col. Colman said he had had a conversation with Mr. James Harkness in regard to the foot-rot in sheep. He understood that he had discovered the cause of foot-rot, and how it could be cured. If that was so, it was a very important discovery. As it had never been made known, he hoped that Mr. Harkness would be invited to appear before the Board.

Mr. James Harkness, an Illinois farmer, being present, was invited to speak on the subject of foot-rot in sheep. He unloaded a basket of sheep's feet, and exhibited a bottle containing a number of glands extracted from the feet of sheep having the rot. He said a friend of his, Mr. Page, had a few very fine rams, worth $200 or $300 each, that became afflicted with foot-rot; told him a remedy, and he used it and got them nearly well. He took them to Mr. Forsyth's, and they took the disease again. A boy from Texas came along, and said he knew what was the matter—that there was a small worm in the foot; he took his knife and cut out what he supposed to be a worm, but which proved to be a gland. Mr. Harkness exhibited several glands about half an inch in length, looking like worms, which he had taken from between the cloven hoof of the sheep, in front, and showed the location of the disease. Prof. Riley had examined the matter contained in the gland, with a microscope, and found that the diseased gland contained pus—a black matter, that caused the disease. The remedy is to take a probe and cut into the gland and let the matter out, and then apply a mixture containing two parts of tincture of calendula and one part of tincture of myrrh. When the sore has spread to the bottom of the hoof, pare away the rough part of the hoof with a knife, and wash it with sulphate of iron, and bind up the hoof with a strip of cotton cloth, wrapped in the cleft in the form of a figure 8. Mr. Forsyth served all his sheep and goats in this way, and the disease has not appeared among them since.

Prof. Riley was not satisfied that this disease of the gland was the cause of the rot. Veterinary surgeons would not agree with Mr. Harkness.

Mr. Harkness said the origin of diseases was always difficult to ascertain. In the foot-rot, the matter that exudes from the sore gland inoculates other animals; one diseased foot will inoculate millions.

Mr. Harkness gave a practical illustration of the mode of curing the disease.

Mr. Colman was then called upon to discuss the subject assigned him, viz: "Cattle for Special Uses; Show Animals—are they injured in Reproductive Stamina by the mode they are fitted for Exhibition?"

He said he would enumerate some of the breeds adapted to special uses. The Jersey cattle had been carefully cultivated for the last two or three hundred years, on the Jersey or Alderney islands. The special uses for which that breed was designed was butter-making, and there was no breed that was more admirably adapted for that purpose. He had seen milk which they produced that was one-quarter cream. The milk was exceedingly rich, and possessed butter-making properties to a remarkable degree. For cheese-making purposes, the Ayrshire was taking the lead. The Devonshire was a breed that was not popular in this State. It was one of the hardiest breeds we have. Its milk is rich; it made good butter, and its beef was of a high quality. The Holstein or lowland breed, from Germany, gave a rich quality of milk, made excellent butter, and are well adapted for beef-making purposes. He thought that in ten years they would produce a revolution in our notions of the different breeds of cattle. For beef-making, the Durham, on account of its great size, its early maturity, and the rapidity with which it made its fat, would always stand at the head. Referring to the second branch of his subject, he said there were two sides to that question. Upon the first view, most persons would be inclined to think that show animals were injured in reproductive stamina; but from a large observation, he was satisfied that this was not so much the case as was generally supposed. He had been, during the past summer, to some farmers who had exhibited much of their stock at fairs. He had not noticed any diminution of reproductive stamina. As a general rule, he was on the negative of the question.

Mr. Bailey agreed generally with Col. Colman. If there was any detriment, it was to the younger animals. Especially heifers were affected so as to become barren, or poor breeders.

Mr. Harkness—The bulls are affected similarly; they also become barren, and oftentimes impotent.

On motion, the Board then adjourned to half-past one o'clock P. M.

Afternoon Session.

The Board met pursuant to adjournment.

Present—Same as in the forenoon.

On motion, it was

Resolved, That the Board now proceed and fill the vacancies occurring in the Board by the expiration of the term of service of one-third of the members.

The Recording Secretary, by request, read from the proceedings of the Board at the annual meeting in December, 1868, from which it appeared that Messrs. Wm. S. Dyer, Henry T. Mudd, Barnabas Smith and Wm. Stark were then elected members; consequently that their term of service expires with the present annual meeting.

On motion, it was

Resolved, That the vacancies be filled in the order in which they stand on the list.

The Board then proceeded to fill the vacancy occurring by the expiration of the term of service of Dr. W. S. Dyer.

Messrs Kinney, Bailey and Husmann were appointed to collect and count the ballots.

Mr. Colman nominated J. J. Squire, of Jefferson county.

A ballot being had, resulted in J. J. Squire receiving eleven votes; being all that were cast, he was declared duly elected a member of the Board for the ensuing three years.

The ballot for the second vacancy resulted, for Henry T. Mudd eleven votes, and he was declared elected.

The ballot cast for filling the third vacancy resulted, for Barnabas Smith eleven votes, and he was declared duly elected.

The ballot for filling the fourth vacancy resulted, for Wm. Stark eleven votes, and he was declared duly elected.

Col. Colman then offered the following preamble and resolutions, which were adopted.

Whereas, Judge James Moore, a member of this Board, has changed his residence and engaged in business in the State of Pennsylvania; therefore, be it

Resolved, That it is the sense of this Board that a vacancy exists by virtue of the removal of Judge Moore from the State.

Resolved, That this annual meeting now proceed to fill said vacancy by an election.

Mr. Stephens nominated Charles E. Leonard, of Cooper county, for said vacancy.

Mr. Husmann nominated Judge D. W. Painter, of Gasconade county.

Mr. Colman nominated General Marmaduke.

There being no other nominations, a ballot was had, which resulted as follows:

Charles E. Leonard	8
D. W. Painter	2
Gen. Marmaduke	1

Charles E. Leonard, having received a majority of all the votes cast, was declared duly elected to serve the unexpired term of Judge Moore.

On motion of Col. Colman, the thanks of the Board were tendered to the officers of the County Agricultural and Mechanical Associations, who attended this annual meeting and participated and assisted in its deliberations.

On motion, the annual meeting then adjourned.

JOHN H. TICE,
Recording Secretary.

MEETING OF THE NEW BOARD.

OFFICE OF STATE BOARD OF AGRICULTURE,
ST. LOUIS, December 8, 1871.

The Board met pursuant to a call of the President. There were *Present*—Henry T. Mudd, John W. Harris, Wm. T. Essex, N. J. Colman, George Husmann, William Stark, J. J. Squire, Barnabas Smith and George W. Kinney.

Absent—Charles E. Leonard, J. F. Wielandy and O. H. P. Lear.

A quorum being present, it was declared that the Board was ready for the transaction of business.

Mr. Mudd called the Vice-President to the chair.

Mr. Mudd then offered the following resolution, which was adopted:

Resolved, That the Board now proceed and effect its organization by electing officers for the ensuing year.

Mr. Harris said the first business in order was the election of a President of the Board.

Mr. Smith nominated Mr. Mudd for re-election.

Mr. Mudd said he had served since the organization of the Board, and he really thought the members should relieve him of further duty. He had asked this on several occasions before, but it had not been conceded. As he not only desired to be relieved, but had made up his mind that a change should be made, he therefore nominated Norman J. Colman for President.

Mr. Colman declined, and urged the re-election of Mr. Mudd.

Messrs. Kinney and Smith were appointed to collect and count the ballots, which resulted as follows:

Henry T. Mudd	5
Norman J. Colman	4

Mr. Mudd, having received a majority of the votes cast, was declared duly elected President of the Board for the ensuing year.

The next business in order was the election of a Vice-President.

Mr. Harris was nominated.

The ballot resulted as follows:

John W. Harris..... 8
N. J. Colman..... 1

John W. Harris, of Boone county, having received a majority of the votes cast, was declared duly elected Vice-President for the ensuing year.

The election of Treasurer being in order, the ballot resulted, for

Mr. Essex..... 7

Being all the votes cast, Mr. Wm. T. Essex was declared duly elected Treasurer of the Board for the ensuing year.

The election of Recording Secretary being in order, the ballot taken resulted as follows:

J. H. Tice..... 8

Mr. J. H. Tice, having received all the votes cast, was declared duly elected Recording Secretary for the ensuing year.

The election of Corresponding Secretary being in order,

Mr. Essex nominated C. W. Murtfeldt for re-election.

Mr. Colman nominated John F. Wielandy, of Cole county.

A ballot being had, resulted as follows:

C. W. Murtfeldt..... 1
John F. Wielandy..... 7

Mr. Wielandy, having received a majority of the votes cast, was declared duly elected Corresponding Secretary of the Board for the ensuing year.

Mr. Colman said there was some unfinished business of the old Board, which should now be attended to, namely, the appointing, a new committee for awarding the premium offered by this Board for the best farm. There were two farms competing for the premium, namely, one owned by Hon. J. W. Harris, of Boone county, and the other, that owned by Major Gentry, of Cooper county.

The President appointed Messrs. Colman and Leonard a committee to award said premium.

Mr. Murtfeldt submitted a bill for traveling expenses while on business for the Board, amounting to thirty-three ($33.00) dollars, which was allowed and ordered to be paid.

Mr. Mudd, who attended the Agricultural Congress at Augusta, Georgia, said he had paid five dollars toward publishing its transactions, which was allowed and ordered to be paid.

Mr. Smith moved that when the Board gets through with its regular business it hold an executive session for consultation; which was adopted.

On motion of Mr. Colman, the thanks of this Board were tendered to the reporters of the Missouri Republican and the Missouri Democrat, for the full and satisfactory manner in which they have reported the daily proceedings of this Board.

The Board then went into executive session.

The doors being reopened,

On motion, Messrs. Kinney, Colman and Wielandy were appointed a committee for revision and supervision of the publication of the annual report.

On motion, it was ordered that the President and Recording Secretary issue warrants upon the Treasurer for the amounts of the premiums upon the certificate of the awarding committee.

On motion, the Board then adjourned *sine die*.

JOHN H. TICE,
Recording Secretary.

PROCEEDINGS

OF THE

MISSOURI HORTICULTURAL SOCIETY

AT THE

THIRTEENTH ANNUAL MEETING

HELD AT

KANSAS CITY, JANUARY 9-11, 1872.

MEMBERS OF MISSOURI STATE HORTICULTURAL SOCIETY---1872.

LIFE MEMBERS.

Henry T. Mudd	St. Louis	Charles Peabody	St. Louis
A. E. Trabue	Hannibal	John H. Tice	St. Louis
Hezekiah Clagett	Gray's Summit		

ANNUAL MEMBERS.

Wm. M. King	St. Louis	W. E. McBride	Independence
Wm. E. Sheffield	Kansas City	G. C. Swallow	Columbia
J. A. Blair	Lee's Summit	Zathe Todd	Harlem
R. J. Lewis	Westport	Junius Chaffee	Kansas City
S. W. Salisbury	Kansas City	J. C. Evans	Harlem
C. F. Hawley	Kansas City	William Mustard	Kansas City
G. M. Dewey	Keytesville	A. J. Stewart	Chillicothe
G. A. Horning	Westport	Thomas Glass	
H. M. Vories	St. Joseph	D. L. Hall	Kansas City
L. G. Munger	St. Joseph	George S. Park	Parkville
U. P. Bennett	Independence	C. W. Murtfeldt	Kirkwood
N. J. Colman	St. Louis	James A. Storm	St. Joseph
D. M. Reichard	St. Joseph	Jacob Madinger	St. Joseph
James W. Cook	Kansas City	W. R. Stone	Kansas City
William Stark	Louisiana	J. P. Richard	St. Joseph
John F. Wielandy	Jefferson City	D. S. Holman	Springfield
James Skinner	Kansas City	C. H. Allen	Kansas City
W. S. Coventry	Holden		

OFFICERS FOR 1872.

H. M. VORIES, St. Joseph ..... *President.*
CHAS. PEABODY, St. Louis. ..... *Vice-President, 1st District.*
NORMAN J. COLMAN, St. Louis ..... " " 2nd "
ALVA CULVER, Ste. Genevieve ..... " " 3rd "
F. F. FINE, Springfield ..... " " 4th "
F. A. NITCHY, Jefferson City ..... " " 5th "
GEO. S. PARK, Parkville ..... " " 6th "
A. J. STEWART, Chillicothe ..... " " 7th "
O. H. P. LEAR, Hannibal ..... " " 8th "
WM. STARK, Louisiana ..... " " 9th "
DANIEL L. HALL, Kansas City ..... *Secretary.*
JOHN H. TICE, St. Louis ..... *Treasurer.*

PROCEEDINGS

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY.

The thirteenth annual meeting of the society was held in the court-room at Kansas City, in accordance with the following circular:

MISSOURI STATE HORTICULTURAL SOCIETY.

The Thirteenth Annual Meeting of this society will be held in Kansas City, on Tuesday, Wednesday, Thursday and Friday, January 9, 10, 11 and 12, 1871.

All local Horticultural and Agricultural Societies are requested to be represented, either by delegates or otherwise. And all friends of Horticulture and Pomology, whether from this State or elsewhere, are requested to be present and participate in the discussions of the meeting.

Our discussions are intended to be of the most free and practical character—the object being to obtain the most reliable information in reference to the most profitable manner of conducting the beautiful and useful art and occupation of Horticulture.

The presence of the wives and daughters of the members, as well as other lady friends, is solicited and expected.

Specimens of fruits, flowers, and all other Horticultural products, and also of Horticultural implements, are solicited.

Short and practical essays on Horticultural subjects will be thankfully received.

Arrangements are expected to be made with the railroads leading to Kansas City to extend their accustomed liberality for the return of members and visitors.

A hall will be furnished, and suitable arrangements made for the entertainment of the officers and members of the Society, by the liberality of "The Missouri Valley Horticultural Society at Kansas City."

Persons wishing to become members of the Society can do so by giving their names, with the sum of two dollars, to the Treasurer; and those unable to attend can become members, by sending two dollars either to the Secretary or Treasurer. Each one becoming a member will be entitled to a copy of the Transactions of the Society, when printed, with the Report of the State Board of Agriculture.

H. M. VORIES, *President.*

WM. MUIR, *Secretary.*

The meeting was called to order at 2 P. M., on Tuesday, January 9, 1872, by the President, H. M. Vories, of St. Joseph, who announced that, the Secretary being absent, it would be necessary to elect a Secretary *pro tem.*

On motion of U. P. Bennett, of Independence, Daniel L. Hall, of Kansas City, was so elected.

R. J. Lewis, of Westport, President of the Missouri Valley Horticultural Society, then delivered the following address of welcome:

MR. PRESIDENT, AND GENTLEMEN OF THE STATE HORTICULTURAL SOCIETY: At the last annual meeting of your society the question was asked, when the propriety of adjourning to this city was discussed, is there a Horticultural Society at Kansas City? The answer was, that Kansas City is the meeting place of the Missouri Valley Horticultural Society; and I am happy to be able to say that the same is in existence to-day, and it affords me pleasure, on this occasion, in behalf of that Society, to welcome you to Kansas City.

Although this is the first time your Society has convened in this part of our State, it is by no means the first time your elevating influence has been recognized here.

It would seem, at this particular time, hearing, as we so frequently do, of the misfortunes and corruptions arising, both in private and public life, in our great cities, that the dissemination of horticultural knowledge is highly appropriate.

Indeed, it would seem that the agricultural and horticultural interests of our country are, to a great extent, not only the basis of its material prosperity, but are as well the promotion of its social and moral happiness.

And first among the influences that may stay the tendency to speculation and corruption that seems to such an extent to pervade the country is the occupation, the knowledge, the elevating associations, resulting from the teachings of societies like yours.

Your Society, organized, as it is, not to promote any political or pecuniary end, but with a view of acquiring and disseminating knowledge, will grow as the material and social interests of the country are developed; and while personal and national prosperity and independence are appreciated and cherished among men, societies like yours will be built up and sustained.

So the presumptions are, that your Society will continue to exist. Indeed, the experience of mankind has shown that all education and a high order of civilization are developed, in any part of the world, in the same proportion as the arts of horticulture and agriculture are advanced.

Hitherto, in many parts of our country the attention of the rural districts has been confined to two or three staples; but now, owing much to the influence of societies like yours, and the teachings of agricultural and horticultural periodicals, a new era seems to be

opening; formerly where wheat, corn and hemp were the products, now the apple and the peach, the grape and the pear are added.

He who cultivates corn alone, I apprehend, has a very limited means of intellectual improvement arising from his occupation. If wheat is added, an opportunity is afforded to compare their relative profits—their adaptability to various soils. If to these, small grains, the grapes, with clover and stock, are added, this opportunity is increased in a progressive ratio by every addition, as well as affording an opportunity to test the propriety of rotation of crops; but if to all these, the cultivation of fruits and flowers is added, the field is almost infinitely extended; the cultivator comes at once in contact with more permanent and refined organizations, requiring of him a corresponding degree of forethought and intelligent exertion. In this department he has to deal with nature in her more beautiful as well as her more delicate forms, and whatever of natural ability or high cultivation he may possess, he will find here an ample field for its exercise and gratification. In this connection I might speak of the development of character arising from horticultural pursuits. As the peach is a more complicated organization than a potato, as a pear is a more delicate growth than a pumpkin, a rose bush is a more beautiful object than a tobacco plant, it is reasonable to suppose that by our association with these delicate, refined and beautiful objects, a corresponding character would thereby be developed in us. Our State Entomologist, in his third annual report, very properly, I think, seems to advance the idea, that the Great Creator, in the formation of all things, works by natural laws, originally ordained by him, and, by the constant exercise of his prerogative, continues

> "The great miracle that still goes on,
> In silence round us, the perpetual work
> Of the creation, finished, yet renewed
> Forever."

So, if we may compare smaller things with greater, our characters are developed, not by instantaneous efforts, but by the operation of the well-established law of association, and by the exercise of our various powers; and if these associations and exercises are, happilly, confined to the refined, the beautiful and true, the character developed will be like a well-pruned tree—the top nicely balanced, with the light beaming evenly through all its branches, a beautiful object of contemplation.

In conclusion, allow me to express the hope that your stay with us may be pleasant to you; and, believing that your deliberations will be instructive to all present, as well as the community at large, permit me again to welcome you to Kansas City.

The President then delivered the following

ADDRESS.

GENTLEMEN—MEMBERS OF THE STATE HORTICULTURAL SOCIETY: We have now met for the thirteenth time, for the purpose of consulting each other in reference to the Horticultural interests of Missouri. I have reason to hope that the present meeting will be a profitable one.

The harvest of the past season has been sufficient to call forth the gratitude of every lover of Horticulture. Perhaps there has been no season since the organization of this Society, in which the production of fruit and vegetables has been more bountiful and satisfactory. It is no longer a question in Missouri, whether the fruits and vegetables usually grown in similar latitudes can be successfully and profitably grown; but the question which you are expected to settle is, what varieties and kinds can be cultivated with the greatest certainty of profit and success? And what is the most successful and cheap manner of cultivation? What to plant, the particular kind of soil and situation in which to plant, and the mode and manner of cultivation, are the matters about which the people of this State are at this time the most deeply concerned. It is also important that we should learn to meet and vanquish the insect enemies which threaten the destruction of both fruit and vegetables, and which have been so destructive in other portions of the country. In this direction, we look with confidence to the efficient and untiring offorts of the State Entomologist, Mr. Riley, for assistance.

After the experience of the past season, and since the exhibition of the fruits of this State, at the late fair at St. Louis, and at the Horticultural fair at St. Joseph, in September last, and also at the exposition held in Kansas City in October last, it is no longer doubted that the State of Missouri, together with portions of the States of Kansas and Nebraska, is, all taken together, the finest apple-growing country now known, of the same extent. I think that I hazard nothing in saying that this is true not only in reference to the productiveness of the trees, but also in reference to the size, beauty, and excellence of the quality, of the fruit. It is also a notable fact that Missouri has, in the last few years, produced several seedling apples, which are unsurpassed for their beauty, fine flavor, and other desirable qualities; this encourages the belief that it is in this country, where the best fruit of known varieties is produced, that we may expect the highest results from the propagation of new varieties from the seed. The attention of the Society is particularly directed to this subject, as well as to the necessity of furnishing a carefully revised list of apples which are known to be the most productive, and otherwise desirable, in the different portions of this State. It is important that producers should plant but a few varieties, and that those varieties planted should be of the very best. A variety, to be profitable, should not only be productive, but it should have good size, possess

beauty of appearance, and not be too tender to carry it to market; for, however strange it may seem, yet it is a fact, that some of the very finest flavored apples produced in the country are constantly rejected in market, and have to give place to others not so good in flavor, but having more size and beauty.

The past season has served to confirm the conviction that, unless some remedy can be discovered for the blight of pear trees, the cultivation of pears in this State, except by amateurs, might as well be abandoned. All lovers of good fruit will regret this; for except for this disease of the tree, there is no country that would produce pears more abundantly, or of higher quality.

Experience, I think, has also shown that the attempt to cultivate cherries in this State, of the Hart or other sweet varieties, has only been followed by disappointment, while several varieties of the sour, or Morello and Kentish varieties, have succeeded well. It would be of great use to those who wish to plant cherries to have proper information on that subject. I therefore earnestly recommend that this Society, at its present session, will make a carefully revised list of varieties which have proved the most hardy and profitable in the different portions of the State.

Peach culture in this State is beginning to excite some attention; but the finest varieties have not been extensively cultivated, except in a very few localities. It has, however, been ascertained that the different varieties of peaches differ very materially in reference to their ability to withstand the freezing consequent on our severe winters. A carefully prepared list of those varieties which have been found, by actual experience, to stand the greatest degree of cold and still be fruitful, would be of great value to cultivators; and I hope that this Society will carefully consider the subject during the present meeting.

It would be out of place for me, in this address, to enter into the discussion of the subject of the cultivation of small fruits in this State; but the cultivation of grapes has become so important that it can not, of course, escape our attention. The grape harvest in this State, last season, was remarkable, both for the abundance of the crop, and for the excellence of the quality of the fruit. The price at which the fruit was marketed, however, was so low as to discourage many new beginners who had been led to believe that a fortune could be made from a few acres of grapes; but to the thoughtful cultivator the low prices was no source of alarm, for until grapes and wine can be introduced into general use, and become alike used by the rich and the poor, the quantity used will not justify any extended cultivation. But after they are introduced into general use, the cultivation of grapes will become better understood, and as the market becomes larger, the business will be more certain and profitable. The almost endless number of varieties of grapes now being introduced and recommended by their respeciive friends and interested parties, are such as to almost bewilder the minds of cultivators.

Taking into consideration this state of things, as well as the necessity that exists for cultivating none but the best, either for the table or for wine, it has become a matter of the first importance that this Society should, at its present meeting, by an intelligent and experienced committee, prepare and publish a list comprising the best known varieties, which have been sufficiently tested to be recommended for general cultivation in the different portions of the State, either for the table or for wine.

It is believed, by those who are acquainted with the subject, that fruit-growing, as well as all other branches of horticulture, would be much benefited, particularly on our large prairies, by the planting of timber on the north and west of each farm, to serve as a wind-break. There is nothing, perhaps, that would add more to the appearance of a prairie country, and nothing could add more to its value, than a careful system of timber-planting. Let every farmer plant his grove of timber, and let the grove be interspersed with evergreens so as to effectually break the cold winds from the North and Northwest, in the winter, and it is believed that the temperature of our winters might be so moderated as to make it practicable to cultivate many varieties of fruit, which have so far proved too tender for our winters. Whether this would be the result or not, it is certain that these wind-breaks would add more to the value of the country than double the amount of their cost. While it is not exactly a horticultural pursuit, I hope that this Society will give its influence in favor of the planting of trees, both for timber and wind-breaks, and give suggestions in reference to the best trees to be planted for the purpose.

One of the greatest hindrances to the full development of horticulture, and indeed all of the productive pursuits of the country, will be found in the inclination of the young men of the country to abandon all productive pursuits, and congregate in the towns and cities. Indeed, I need not say that it is the inclination of the young only; for it is a fact that both young and old seem to be inclined to abandon the farm and garden, and seek a more pleasurable occupation in the cities. By a reference to the late census, it will be seen that in many places, particularly in the Eastern States, the rural and farming districts have decreased in population, while in the towns and cities in the same sections of country, the population has invariably increased. The rule seems to be, that no one cultivates the soil who can make a living in any other way. This idea drives from the farm and garden every young man who is possessed of business qualities, and has energy enough to develop the country in an intelligent way. These young men leave the homestead, and go to the cities in quest of pleasure and a more refined society. The only remedy for this is to elevate the standard of taste, refinement and education among farmers and horticulturists. Let every farmer and horticulturist see that his sons are educated in a manner that will make them easy in society. Fur-

nish them good libraries of choice books to read; study to be economical of the labor of his sons, so as to give them time to read and improve their minds; and, above all, make his home both comfortable and attractive; ornament the grounds around the dwelling with shrubs and flowers—in a word, make the boys proud of their home, and proud to have others visit them. If this is done, the young folks will make society good at home, and will be contented at the old homestead. In this way, labor will be elevated and respected, and country homes, in place of being despised and neglected, will become attractive.

The Legislature, at its last session, appropriated one thousand dollars for the use of this Society. It became a question of some importance to many to ascertain in what way this liberal and generous donation could be the most profitably used. Last April, a special meeting of the Society was called to consider this question among other things then considered. It was found, at said meeting, that the notice of the meeting had not been very generally circulated, and that there were but few members in attendance. It was therefore thought best to only appropriate for use during the past summer a small portion of the money so placed at our disposal. There was, however, some three hundred dollars placed at the disposal of some of the committees of the Society, to be used in paying their expenses while making investigations for the information and benefit of the Society and of horticulture. These committees will, of course, report to the society at this meeting, and give a full account of their researches and investigations. The balance of this fund is still to be disposed of by your Society, in such manner as you may think will result in the greatest benefit to the pursuit of horticulture in the State. I would recommend that the money be used in making a thorough investigation of whatever is undertaken, and that it may not be appropriated in insignificant amounts, and to objects to the accomplishment of which it is not adequate, and thus be frittered away and nothing be accomplished; but rather let it all be directed to one object, in which good may be accomplished.

It would be improper that I should close this address without, on my own part and on the part of the Society that I represent, returning thanks to the members of the Society at Kansas City, as well as to the citizens in general, for the kindness and hospitality extended to the officers and members of this Society, as well as of visiting friends, upon this occasion. Such liberality and kindness, not unusual to the people of this city, will not be forgotten by those who are its recipients. Situated, as the people of Kansas City are, in one of the most productive countries known to civilization; situated in a healthful and agreeable climate, with a public spirit which has no bounds, it requires no prophet to foresee her glorious destiny.

Mr. Tice moved the following, which was adopted:

Resolved, That the membership fee of this Society be reduced to the sum of one dollar.

On motion, the President's address was referred to a committee of three, consisting of John H. Tice, Geo. S. Park and U. P. Bennett.

On motion, the reading of the minutes of the last meeting was dispensed with.

Reports of Vice-Presidents being in order, Geo. S. Park, Vice-President from the Sixth District, read the following report:

MR. PRESIDENT: I had purposed to visit all sections of this Congressional District; but care and business have so pressed me, that I really have not found the time. I made a pretty full report last year, showing the superior advantages of our soil and climate for fruit-growing, and the present year has fully confirmed that report. While there are some dark sections, behind the age, the great body of our people are rapidly coming forward to the front. This fine fruit section does not produce crabs, but new varieties of superior qualities; and they are multiplying to puzzle the doctors, and wake up rivalry. They speak for themselves, and hoe their own row.

Nurseries are springing up everywhere, and the growth of the young trees is rapid and healthy. Our two year olds are equal to three year olds at the East. They are clean, healthy and vigorous. We advise Eastern fruit-growers to purchase their trees here at the West, where they will find nurseries that are an honor to any country, and whose fame will be co-extensive with the United States. We have the great "Rural World" to direct us; and the "Western Planter" to ventilate our progress. We are a happy people, sure.

We have had bountiful crops of fruit the past season. Strawberries, raspberries, yes, mammoth clusters, in profusion; blackberries, cherries, plums, pears and apples — and such fruits! Pomona certainly showered her choicest blessings. Wasn't it glorious?

Horticultural societies are springing up. The Jackson County Horticultural Society, at Independence, is a working body of practical, intelligent men; and the Missouri Valley Horticultural Society, established at Kansas City about two years ago, is working its way onward and upward; and now we are rejoiced to have the State Horticultural Society honor us with their presence. We extend to them the hand of friendship, warmed by the kindliest associations.

The Kansas City Exposition opened a new era to the fruit-growers of the Missouri Valley: they did not know themselves, till they saw what they had done. The fine fruits of that great collection were glorious to behold, and cheering to humanity. Prominent pomologists from the East said they had never before seen such a collection of fruits. But the Missouri Valley begins to know herself, as you will see, and now claims to be the banner section of the fruit-growing world. Our fruit-growers begin to ship fruit to the plains and mountains. Car load after car load has been sent off this last fall. We have new and vast markets opening; on the South, Texas, the West Indies, and South America; on the West, the great Plains, and the whole vast mountain region, from the mouth of McKenzie's River to the Isthmus of Darien; to the North, we have the rich plains of Dakotah and Minnesota — too cold for fruit-growing; and farther on the wide British posessions; markets good enough to satisfy any one. We say, then, to the fruit-growers of the Missouri Valley, *go on.* "Everything is lovely, and the goose hangs high!"

Mr. Wm. Stark, Vice-President from the Ninth District, presented the following report, which was read by the Secretary:

LOUISIANA, MO., January 8, 1872.

To the President of the State Horticultural Society:

This district is that portion of Missouri lying farthest to the south-east, between the Mississippi and Missouri rivers, and being on both sides of the thirty-ninth degree of north latitude, and is composed of the counties of St. Charles, Warren, Callaway, Boone, Monroe, Ralls, Audrain, Montgomery, Lincoln and Pike. It has a river front on the Mississippi of about one hundred and fifteen miles, and a greater river front on the Missouri. The St. Louis, Kansas City and Northern Railway runs through this district from the south-east to the north-west, and the Columbia branch of said road, running from Centralia, is also in this district. The Central Missouri Railroad, running from Hannibal to Moberly, is mostly in this district, and also a portion of the Hannibal and St. Joseph Railroad. The Louisiana and Missouri River Railroad, extending from Louisiana to Jefferson City, is entirely in the Ninth District, and the main line of this road, running west from Mexico toward Kansas City, through Audrain and Boone counties, is in this district. The St. Louis and Keokuk Railroad is in process of construction. All that portion of said road between St. Charles and the Hannibal fair grounds, together with the branch extending from New London, in Ralls county, south-west toward Mexico, is in this district. Thus it will be seen that few

sections of the west can lay claim to facilities for transportation equal to those enjoyed by this section of Missouri.

Lying, as this district does, just above St. Louis, the great and rapidly growing metropolis of the Mississippi valley, and almost midway between New Orleans on the one hand, and St. Paul on the other, both of which places can be reached by either rail or river, and containing within its borders about four hundred miles of finished railroads, with a prospect of several hundred miles more in a very few years, together with its two hundred and fifty miles of river navigation, render this portion of the State a highly favored location for commercial fruit-growing. In a very few years there will be but small portions, here and there, as much as ten miles from a railroad or navigable river. I trust these references to our facilities for shipping will not be considered out of order, when it is so well known that nothing is of more importance to the commercial fruit-grower than safe and rapid means to transport his products to those sections of the country that buy and consume them.

This district lies about the center, north and south, of the best apple producing belt of country in the United States, and it is not surpassed in the production of the other valuable fruits that are successfully raised in this climate. The peach, probably, should be excepted, as it often does better a little further south. Here the grape seems perfectly at home. The fine vineyards of the Bluffton Wine Company, together with those in the vicinity of Hannibal, Clarksville, Louisiana, and many other places, prove this section to be unsurpassed in the production of this most delicious and healthy fruit. A little more care in the selection of safe and hardy varieties now seems to be one of the most essential points in the successful prosecution of this branch of horticulture. The grape crop has seldom, if ever, been better than in 1871. Here all the small fruits, when properly cared for, succeed very well. While the pear still suffers, more or less, from blight, it is well worth a place in every orchard and fruit garden. Some refuse to plant pear trees, fearing they may be destroyed by blight before they can gather the golden fruit, seeming unmindful of the fact that he who would reap must sow.

While the most of the other fruits are highly valuable, and may very properly be considered both a luxury and a necessity, yet none of them will compete, in a commercial point of view, with the apple. Apples can be put into market every day in the year, and the best keeping varieties can be sent to market all over the United States, and even into the markets of foreign countries, in almost as good condition as when they leave the orchard. These characteristics of the apple will continue to make it one of the most valuable productions of the country. With our present means of transportation, our apples can be sent in forty-eight hours, either north, south or west, into sections of the country that cannot produce apples, or, at least, where apples cannot grow worthy of the name when compared with such as we produce in this favored clime.

I will close with a few hints to those about planting commercial orchards. It is often asked: Will raising apples continue to pay? I answer, if pursued under favorable circumstances, it will; but if the conditions are unfavorable it may not. If the planter selects a bad location for his orchard, plants poor trees, and then takes improper care of them, and plants varieties that bear poorly, though the fruit be ever so fine in quality, and plants where he cannot readily reach the markets that need his products, he will most assuredly fail to make his business pay. But, on the other hand, if he will select a good location for his orchard, and plant good, thrifty trees, and then give them the proper care in pruning and cultivation, and plant such varieties as bear well, look well, and ship well, though they may not be extra in quality, and will plant where he can reach with certainty those portions of the country that buy his products, he will most certainly make a commercial orchard pay. The proper selection of varieties cannot be too strongly impressed on the mind of the young, or even the experienced, horticulturist. Right here lies the cause of failure, or the key to success, in thousands of cases. Plant such sorts of fruit as are known to succeed well in your section of country. Do not go too far to buy new and rare sorts, at fabulous prices, for this character of commerce usually pays the seller much better than the buyer.

WM. STARK.

No other Vice-Presidents being present, and no report being received from the Secretary, the Treasurer presented the following report:

JOHN H. TICE, Treasurer, *In account with Missouri State Horticultural Society:*

Nov. 28, 1870	For amount of membership, as follows: B. L. Stevens, T. W. Guy, O. H. P. Lear, C. H. Mansur, John Logan, James Roberts, J. C. Parker, A. H. Vories, L. G. Munger, E. J. Montague, R. H. W. Hartwig, Levi C. Clark, Jacob Madinger, A. J. Sheffield, D. M. Reichard, Alex. Reeder, Chas. Whitney, J. F. Taft, Wm. Stark, C. W. Spalding, F. F. Fine, Joseph L. Vorman, and Gideon Alkin, twenty-three members, at $2	$46 00
	For Chas. Peabody, life member	10 00
April 1, 1871	Amount of quarterly State appropriation	250 00
July 1	" " " "	250 00
October 1	" " " "	250 00
	Total	$806 00
	CONTRA, CR.	
Nov. 28, 1870	By balance due Treasurer per report this day	$53 60
	Amount paid Mr. Peabody, expenses	12 75
	" Dr. Claggett, expenses	10 55
	" S. Spencer, printing	11 00
May 12, 1871	" Wm. Muir, Secretary	50 00
January 1, 1872	Balance on hand	668 10
	Total	$806 00
January 1, 1872	To balance brought down	$668 10

From this amount has to be deducted amounts paid by me as the expenses of the *ad interim* committee of the South District, of which I am a member. Besides, there is an appropriation for the expenses of the *ad interim* committee of the North District, which is not yet presented. I would add, the amount paid for the expenses of the *ad interim* committee of the South District exceeds the appropriation a few dollars, occasioned by failure to obtain a railroad pass for Mr. Fine, of Springfield.

Liberal premiums were offered by the Executive Committee for horticultural products, to be awarded in a joint exhibition of the State Horticultural Society and the Mississippi Valley Grape Growers' Association; but owing to the extraordinary hot and dry summer, and the early maturity of the grape vine, it was not deemed, upon consultation of the two societies, advisable to hold such exhibition.

Whatever the Society may deem it advisable to do the present year for the promotion of horticulture, I think an amount sufficient for a thorough investigation of orchards should be appropriated. That orchards succeed, and succeed well, in some localities, is unquestionable; but orchard husbandry generally must be pronounced a failure. St. Louis is almost dependent, for her supply of winter apples, upon Michigan, Northern Ohio, and Western New York. Now, we ought to be able, not only to raise enough for home consumption, but for transportation. If this can be done, we ought to know the reason why it is not done, and also the way to do it. For this purpose, some competent person should be charged with the duty of visiting the orchards in the State, ascertain their condition, the diseases to which they are subject, the soils on which they grow, and the varieties best adapted to different localities. This is a vast field for investigation, and important results would come of it in promoting this profitable branch of industry, where intelligently pursued.

All of which is most respectfully submitted.

JOHN H. TICE, *Treasurer.*

Mr. Sheffield said he was surprised to hear of such a general failure of the apple crop in St. Louis county, and did not think it was general throughout the State; certainly it is not the case in the Missouri Valley, as the fruits on the tables before us will testify.

Mr. Tice—The facts are unquestionably as stated in my report in regard to St. Louis county, and if you can regularly raise such fruit as we now see before us, you can always sell them in St. Louis at

remunerative prices. We see no such apples in our markets. If you can produce such fruit, orchards will certainly pay. Revision of our fruit lists will do no good unless we go about it in an intelligent manner; we have had too much of recommending varieties on mere hearsay. A variety should be vouched for by practical and experienced men before being admitted to our lists. Several members from different portions of the State said that there was not in any section a general failure of the apple crop, and that a probable reason for the scarcity of good apples in the St. Louis market was, that they would not pay the price demanded for them.

Mr. Stewart—I think that the rapid increase of injurious insects is one great cause of the failure of the apple crop. I have been and am still much troubled with the bodlen moth, and the only way to overcome them is, by a systematic, combined effort on the part of all fruit-growers. It is of very little use for one man to destroy the insects in his orchard, as long as his negligent neighbors keep breeding more for him.

Prof. Swallow said he considered it important that at least a committee be appointed to look up the causes of failure, even if only one county in the State was yet affected. St. Louis county commenced planting orchards earlier than any county in the State, and if they are now failing, it is important that we should, if possible, find out the reasons, so we may guard against the causes. Those who early planted orchards in his (Boone) county, were very successful; but now things are beginning to be different. In many cases three-fourths of the crop has been destroyed or badly damaged by insects. I am sanguine, however, that means will be found by which we can counteract the attacks of our insect enemies.

It was moved that the Treasurer's report be accepted, as far as the financial part of it is concerned, and that the remainder be referred to a committee for report thereon. Carried, and Messrs. Tice, Munger, Sheffield, Stewart and Swallow appointed such committee.

Reports of standing committees were next in order, and Wm. Stark, of Louisiana, from the Committee on Orchards, submitted the following:

MR. Z. S. RAGAN, *Chairman Committee on Orchards*:

DEAR SIR: In compliance with your request, I herewith furnish you some facts and opinions connected with orchard culture in this section of the State.

The fruit crop the past season was only fair in quality, and rather under an average in quantity; both being much impaired by the excessive drouth that prevailed over nearly the entire eastern half of the State during the greater portion of the growing season. You ask, "What kind of apples bear best and are most profitable for commercial purposes?" Ralls Janet, Winesap, Ben Davis, Rome Beauty, and Willow Twig, have fully sustained their well-earned reputation for value in a commercial point of view. Pennock or Large Romanite sells well in Southern markets on account of its size and appearance. The tree being a strong grower, long lived and a good bearer, renders this variety valuable in this part of this State. Pennsylvania Red-streak produced last year a very full crop of very fine-looking fruit, which sold readily in the market. This variety is becoming more popular as it becomes better known. The Newtown Pippin produced a fair crop of fine fruit, doing better last season than for several years past. Ortley, or White Belleflower, which suffered from scab in 1869, bore in 1871 a fine crop of splendid fruit, which goes far toward

re-establishing its reputation as one of the most popular late fall and early winter varieties. The White Winter Pearmain, which suffered some from scab in 1869, bore a heavy crop of good fruit last year, which sold well in the market, and is fast becoming a favorite as a family apple. Smith's Cider is a great bearer, and the fruit sells well in the market. Some of the newer varieties which have claimed the attention of Western fruit-gowers recently, to-wit: Huntsman's Favorite, Grimes' Golden, Lawver and Stark, have not yet borne with us. I trust it will not be deemed out of place here to warn the new beginner who is planting a commercial orchard, against planting a large number of varieties. Let him plant mostly those that bear well, fill barrels fast, and sell quick. The man who would raise apples for profits must raise varieties that look well, as a very large proportion of consumers as well as dealers buy quickest, such as look handsome, without much regard to quality.

The planting of new orchards is constantly going on, which indicates that Eastern Missouri will continue to be in the future, what it has been in the past, a large apple producing district. Our natural market extends from the extreme south to the extreme north in the Mississippi Valley, while some years, 1865 and 1871, for instance, our apples found a market in half the States of the Union. Peach trees should be planted in every orchard and fruit garden; but I consider a "commercial peach orchard," in this latitude, rather a precarious piece of property. Apricot trees bore very full last year. The finer varieties of plums were mostly destroyed by the curculio. The cherry crop was very good. The peach crop was very good the past season. I have confidence in the success of pear culture, when pursued under favorable circumstances, and think this delicious fruit deserves much more attention than it has heretofore received.

WM. STARK.

Mr. Jacob Madinger, from the Committee on Vineyards, submitted a

REPORT FOR NORTH-WEST MISSOURI.

The grape-vines, in the spring of 1871, were in splendid condition; the frost in May injured them very little, except in low locaiities. The grapes bloomed early, from May 20 until June 3. At the time of blooming, the weather was favorable, the grapes set well, and the prospect was fine for a big crop. The storm and hail in July did great damage; in some vineyards destroying from one-third to one-half of the crop. The Concord, Martha, Hartford, Virginia Seedling, Rogers No. 1, Crevelling and Ives soon recovered, and yielded a fair crop — from ten to fifteen pounds to the vine. Catawba, Delaware, Isabella, Walter, Eumelan and Rebecca suffered very much. They dropped their leaves, the fruit and wood did not ripen, and the damage will be felt next year. The first grapes were gathered for market the 27th of July — the time between ripening and blooming being seventy days. The first grapes sold at twenty cents per pound; they soon got lower, and sold at from four to five cents per pound. A great many grapes were sold in our market and shipped North and West. About 25,000 gallons of wine were made in the vicinity of St. Joseph.

The promise of 1872 is now promising, as, although the weather has been very cold, the vines being in good condition, have not been injured, and unless something detrimental turns up we may expect a good crop of grapes in 1872.

JACOB MADINGER.

Mr. King, of St. Louis, stated that Mr. C. V. Riley, the State Entomologist, and chairman of the Committee on Entomology, expected to be present at the meeting and make a report, but was sick and unable to come.

On motion of D. L. Hall, a committee of three was appointed to prepare a revised list of apples, and report to the Society later in the session. Messrs. McBride, Stewart and Tice were appointed.

The Secretary then read the following letter:

GRAY'S SUMMIT, January 4, 1872.

H. M. VORIES, ESQ., *President Missouri State Horticultural Society:*

DEAR SIR: I have received circular announcing the meeting of the Society at Kansas City. I had hoped to be with you there, but find it will be out of my power to attend. I see by your circular that I am charged with the duty of acting on the Business Committee; I fully appreciate the importance of that committee, not only in preparing business to be attended to, but by

promptness in bringing it up and carrying it through, so as to prevent any unnecessary waste of time, the want of which was seriously felt at our last meeting. I trust, however, you will be ably supported in that direction. Allow me to suggest the subject of grape culture and wine making, as claiming paramount consideration. Our Society has done its full share of stimulating extensive planting, without due regard to skill, or fitness of soil, or location. The consequence has been, that the markets have been filled with all sorts of fruit, and all sorts of wine, resulting in ruinous low prices to the cultivator. The important question now is, can we, profiting by the errors of the past, shape a course that will lead to permanent success? I am among those who believe we can.

I will state, briefly, some of the errors that have been committed.

I have already intimated that in many cases too little regard has been had to skill, suitable soil, and location. In many cases the vines have been allowed to overbear, producing inferior fruit, and injuring the health and vigor of the vines. Too large quantities of grapes have been thrown on the market before they were properly ripened, disgusting consumers with half-ripened fruit, and thereby diminishing consumption and reducing the prices. Many vineyards that came under my observation had greatly too many grapes, with too long pruning in winter, and too close pruning in summer, exhausting the few leaves before the grapes were ripe. In many cases the green grapes hang yet on the vines, and the vines in poor condition for a crop the coming season, while other vineyards in the same vicinity, differently managed, produced fair crops of well-ripened fruit that made excellent wine.

My convictions are, that grape growing, like every other business, only more so, can only be made a success by a prudent adaptation of means to ends. While most cultivators of the soil may raise grapes for their own use, I believe it can only be made a successful business by planting on suitable soils, and by proper management. Hundreds of years' experience in Europe prove that a high quality of wine can only be produced in the most favored localities, (in which Missouri abounds,) and the same will prove true here.

Hoping you may have an interesting and profitable meeting, I remain,

Very respectfully, yours,

H. CLAGETT.

On motion, the communication was received and ordered published with the proceedings.

Prof. Swallow addressed the Society on the subject of the State Agricultural College. He stated that the want of experience in getting up a course of study was severely felt, and asked that the members of the Society give him their views on the subject, and look over the course of study already provided, with a view to adding to or correcting it—in short, that the members, some of whom had made a study of this subject, give him the benefit of their experience.

It was moved that a committee be appointed to look into the subject of Agricultural education, and especially the curriculum adopted by Prof. Swallow, and report to the Society during the meeting.

The motion was seconded by Mr. John H. Tice, who said the subject was of the utmost importance. Whatever is done at the Agricultural College should be done well. Probably all we can do at the present time will be to approve or disapprove of the course provided; but hereafter we can have a committee, which should be a standing committee, to look into the proper modes of study in the interim, and report at each session, and thus produce a practical result. It is not so much the amount of what is there taught, as the matter and manner, that is of importance. We want the observing faculties of our children cultivated; not merely lessons from text-books, that go in at one ear and out of the other. Train the pupils to observe closely, and a great object will be attained.

The motion was adopted, and Messrs. Tice, Park, Sheffield, Lewis and Bennett were appointed such committee.

The subject of evening sessions was discussed, and it was determined to hold sessions each evening, commencing at 7 o'clock.

The Business Committee reported that the order for the first evening session would be an essay, by U. P. Bennett, on "Marketing Fruits."

The following committees were then appointed:

On Fruits on the Table—Vandenberg, Storm and Park.

On Wines—Tice, Saalborn and King.

Reports of the *Ad Interim* Committee were called for, and it was stated that they were not yet ready, but would be furnished later in the session.

The following committees were announced for the revision of the Fruit Lists, under the motion adopted:

Peaches—McBride, Park and Munger.

Grapes—Madinger, Horning and Dewey.

Small Fruits—Bennett, Stewart and Goodman.

U. P. Bennett—Can any member give an effective plan to protect our trees from rabbits? They are very troublesome in my neighborhood this year.

President Vories—Take soft-soap and flour of sulphur and mix to the consistency of a thick paste, and wash the trees one or twice during the winter. This remedy has proved effectual with me. Unless in a very wet winter, one washing is enough.

Mr. Stewart—Building paper wrapped around the trees, from the ground up to the hight of two-and-a-half to three feet, is a very effectual protection. It matters not whether the paper is tarred or not.

Corn-stalks wrapped around the tree were also stated to be a protection.

R. J. Lewis—I have an orchard that has a clover-field on one side, and the trees have never been attacked by rabbits. I think the clover is a protection, as it affords food for the rabbits. A corn-field would be also a protection in the same way.

J. A. Blair thought clover afforded a harbor for the rabbits, and considered clean culture decidedly the best.

Mr. Meador has an orchard situated between a clover-field and a corn-field, but the rabbits don't seem to appreciate the situation, and still eat the trees. His only remedy was to kill them.

Mr. Stewart stated that the paper referred to by him was also a partial protection against the borer.

Adjourned.

Evening Session.

Society called to order at 7:30 P. M., by the President. U. P. Bennett, of Independence, read the following essay on

MARKETING FRUITS.

In giving expression to a few practical thoughts on marketing fruits, I write for those who have less knowledge on the subject than I possess. And it is enough for me, in order to accomplish my purpose on this occasion, to present a few hints only, leaving others to enlarge on the subject, thereby making it more useful than for me to make the vain attempt to exhaust the subject.

That difficulties, and even disasters, often occur to the fruit-dealer in his efforts to dispose of his produce, is sadly well known. Nor is it to be expected that they can be wholly avoided in this or any other pursuit. It is at this stage in the business that the greatest skill or tact is required; not that suavity of manner, and glibness of tongue, which will make a purchaser buy your produce, whether he wants it or not, but that judgment and good taste in preparing it for market, as well as that snug management, which closes up the year's business, not only without material loss on the fruits in their season, but with more or less profit. Without claiming to know more than others around me how losses may be avoided, or profits obtained, I venture to call attention to a few facts which, in the light of experience and extended observation, seem to be regarded as essential to anything like permanent success. I begin my enumeration of these important points with

ASSORTING OR GRADING FRUIT FOR MARKET.

The truth can hardly be too often, or too strongly, impressed on the minds of fruit-growers, and especially on those commencing the business, that on nothing does success so much depend, in marketing fruit, as on having it in good order. Superior fruits always sell quickest, and often at extravagant prices. Assorting and grading fruit — putting all uniformly fine together, and the inferior and damaged by themselves, selling each class on its merits — has always paid me well, and, I have reason to believe, given good satisfaction to the consumers. Many persons who appreciate first-class fruit will pay more for that only which is choice and neatly arranged, than the producer can get for both superior and inferior packed and marketed together. My mode is to have each picker carry in her hand two quart baskets, into one putting the large strawberries, into the other the smaller ones; and a moment's care in arranging the berries on top, with the stems downward, gives a luscious beauty to this unsurpassable fruit, and compensates in quickness of sales. I think square quart baskets preferable, where the market is several hundred miles distant. Raspberries and blackberries, having no stems or hulls, press more closely together, and therefore do better, when sent long distances, if put into square pint baskets. The berries will generally keep better on the vines, or if well aired under the packing-shed, than in close cellars or store-rooms in the city. Everywhere "honesty is the best policy," and dealers are by no means slow in learning to discriminate in favor of the brands of honest packers. Excellent fruit, and honest measure, are certain to establish a reputation that will be of great value.

RIPENING FRUIT.

Early in my labors among fruits, I inquired of a gentleman of much experience how he determined what was the proper time to gather pears, and received this answer: "I judge of the maturity of my pears as I do of the age of a man—by appearances." Some little experience is very useful just here. When the time has arrived for gathering the pear, it will have reached its maximum size, its greenness will have changed, and it will have more or less of a yellow tinge. But as good a practical rule as I have found is, that the stem will part readily from the branch when the proper time has come for gathering them. Most of the pears are improved by a continuation of the process of ripening after they are gathered, and this gives the great advantage of shipping

them in a firm condition to distant markets. Last season, I gathered the main part of my Bartlett pears, ripening them in the cellar, and marketing them in fine condition, six weeks before those left on the trees were over-ripe. Early apples and pears, being in their prime only a few days, need to be disposed of in an expeditious manner, so that their transportation to market is a question of more importance than their temporary preservation. Some varieties of apples remain sound, firm, plump and juicy, and the time of their keeping may be considerably extended, if gathered early; among which may be enumerated Rambo, Pryor's Red, Hubbardston's Nonsuch, Westfield Seek-no-farther, Rhode Island Greening, several of the Russets, and all those which show a tendency to fall prematurely; while some others, such as Rawles' Janet, will even bear a little freezing without much damage.

Those fruits which are found to attain their greatest excellence and most perfect ripening upon the tree or vine—such as peaches, plums, cherries, strawberries, raspberries, etc.—can never be enjoyed elsewhere, in so great perfection, as in close proximity to the orchard, for the reason that so soon as they are severed from the vine or tree, the process of decomposition commences, which may be hastened by the state of the weather, or the manner in which they are handled. Hence, all of these classes of fruits are better adapted to a near than a distant market. Many of them are, however, sent considerable distances, reaching the market in a reasonably good state of preservation. Peaches, carefully gathered before they reach their prime, and berries forwarded in small, well-ventilated packages, may be advantageously shipped two or three hundred miles, when handled with especial care.

THINNING THE FRUIT.

The usual method pursued by horticulturists who practice thinning is to go over the trees when the fruit is small, and systematically remove such a proportion as may be deemed sufficient, (a third or half,) and when doing this, all the inferior specimens are first taken off. This is found to pay very well in the increased size, appearance and flavor of those that remain. I observe that I take off a good many more now than when I first began to thin my pears — experience teaching me that it pays to do so.

When thinning has been omitted until the fruit has attained to one-half its usual size, it will be profitable with some varieties of apples and pears to take off a considerable portion, and prepare them for market, while those left on the trees will become large and every way finer, selling readily for more money than the whole crop would bring, if left on the trees until the natural period of maturity. By cutting off the ends of bearing shoots on peach and nectarine trees, when the fruit is yet small, and removing the excess of foliage, an increased size and hightened color of the fruit is insured; the remaining fruit to be also thinned, so that specimens shall not crowd each other. Some fruit-growers thin their peaches so as not to allow them nearer than eight or nine inches of each other on the same branch; but the judgment of the operator must determine this matter, as no precise rule can be laid down. The man who was laughed at for threshing off a portion of his apples, when they were small, with a long pole, did better than his neighbor who did no thinning at all.

PREPARE FOR A GLUT IN THE MARKET.

The real cause of a glut is not often over-production, but is more generally owing to the arrivals in the principal market of fruit unfit for shipment to the surrounding towns or cities. A day or two of hot, moist weather may throw into this market, in their season, large quantities of strawberries and raspberries that can not be safely sent to points either south, north or west. These, as well as some other kinds of fruit, are in a high degree perishable, and if the weather is bad, and we can not reach our consumers with our berries in good condition, we should be prepared to can or dry them, and thereby avoid loss. The moist, dog-day weather sours the berries; shippers become afraid of them, and leave them in first hands, at the very time when there are thousands of persons in other localities who are languishing and growing sick for want of a varied and generous diet, and who would eagerly take our fruits could they get them. I have found great advantage in having arranged before-hand to fill orders for berries near home, and at different points along express lines, and these are attended to when there is a lull in the market in this city. And when the weather is rainy, I have the raspberries picked every day—if it has to be done between showers—and dried, and in this way have sustained but trifling losses.

The intelligent and enterprising horticulturist, who is working his brains as well as his hands, in raising fruit for others to consume, is a law unto himself in devising the most available means to cultivate and to gratify the growing taste of his consumers; and though he is eagerly driv-

ing after facts pertaining to his business, he is most concerned to know how he shall make the best use of what he does know; and knowing that fine fruit always sells best, he hesitates not to wage war upon the insects that injure or mar his fruit, or to assort and send it to market in the very best condition, whether that require his own conveyance, or special arrangements with railroads or steamboats.

But lest I encroach upon the time of others present, I hasten to the most interesting point in my essay—its conclusion.

Mr. Stewart—Have found the greatest difficulty in marketing fruits to proceed from the small producers, who are not posted as to the value of their fruit, but sell at any price, and thus break down the market. How can we control them?

Mr. Bennett—Fruit coming into the market in good condition will always sell first, and at better prices; those who bring in small quantities usually put it in inferior packages, and the fruit is in poor condition.

Mr. Hall—A great part of success in marketing fruits depends on the producers securing regular customers, and furnishing them a regular supply. If our customers know they can depend on us, they will give us a preference, and we shall obtain a fair price for our fruit, and a steady demand, even though the market be glutted.

Mr. Whitney—How can we best thin our fruit, and will it pay?

Mr. Bennett—Undoubtedly it will pay, although it is a tedious job, and one which requires nerve to execute thoroughly. It is hard to thin out fruit that looks as though it would all be good and ripen perfectly; but take time, and do it systematically, a limb at a time, working with the hand and knife.

The subject of Hedges was taken up, and Mr. L. G. Munger said: I have had much experience and some success in hedge-growing and hedge-planting. I first sub-soil the ground in the fall, as deep as possible, and then plow deeply in the spring, and in every way aim to thoroughly prepare the ground. I sort my plants, putting the best together; then the medium, and so on; make a straight line and plant with a spade, setting the plants four inches apart; cultivate well the first year, and only cut enough to equalize the growth. The second year I cut down, cut below the ground into the yellow part of the plant. I do not believe in plushing; I can turn out a hedge in three years; a rabbit can not get through my hedge; prune every year; whenever the hedge gets too big or high, cut it down to two feet high, and it will stop any cattle. I can cut a mile in three hours.

Will overflowing with water for a week kill a hedge?

I think not, but constant wet ground will do so.

President Vories—Planted his hedge in two rows, six inches apart, and six inches in the row, thus: * * * * * * * * * Did not turn his plants the first year; the second cut them right off at the yellow; was afraid he had ruined his hedge, but it soon grew up, and all in a bunch; third year cut them off about six inches above the ground, and again in mid summer, and now, the fourth year, that hedge will turn any stock or any boy. Is satisfied the plants should

be cut off at the yellow, at or under the ground. Hedges managed in this way will prove successful in this section; but in this, as well as in other horticultural matters, the best ground will produce the best results. A good hedge must be taken care of, not only one year, but every year.

Mr. Munger—Cuts his hedge square until it is grown, and then turns in the shape of a cone; would prefer to seed down a hedge as soon as fully grown. Prefers to prune an established hedge in June; if not practicable at that time, would prune in the fall.

Mr. Whitney—Does a hedge exhaust a large quantity of ground on each side? An orchardist in this vicinity claims that his hedge occupies at least thirty feet on each side, to the damage of his orchard.

Mr. Stewart—I have a hedge around my vineyard, and my grapes come within ten feet of the hedge, and the vines are just as strong, and bear just as well, next to the hedge as elsewhere.

Mr. Munger—My crops near my hedge grow just as well as anywhere.

Mr. Reichard—My observation is that hedges do not exhaust the ground to any great extent. The roots are inclined to run deep, and do not extend any great distance.

Mr. Bennett—Are trees that have gone into winter with the leaves still on, as ready to stand the winter as though they had shed them?

Mr. Tice—I consider it an indication of late, unripe growth, and therefore an indication that the leaves had not entirely fulfilled their office when the frost struck them. The speaker explained the matter at some length, from a scientific stand-point.

Mr. Hall—It is certainly an effect of late, immature growth, and close observation will show that the retention of the leaves is much more prevalent after a wet fall, and much more apt to occur in some varieties than in others, and that the varieties that are most subject to winter-killing or twig-blight are most apt to retain their leaves, and probably from the same reason—late, unripe growth.

Question—Will the sweet cherries succeed in this State?

Mr. Vories—I have been foolish enough to plant two orchards of sweet cherries, and have never had any of them winter-killed. For the first four or five seasons they did better than the Morellos; but soon they began to die, and I have lost all. They did not winter-kill, but cracked and blighted in the summer. I consider the theory of root-pruning is false, as applied to Missouri. I have noticed a frost in the spring will kill all the sweet cherry blossoms, when the sour ones will escape; one is decomposed by frost, and the other is not. The same thing holds true with the different varieties of peaches and apples. It is therefore of the utmost importance that we should find out which will stand frost and which will not. The practical results are what we want; not how the different changes come, but to what

varieties they occur, so we may know what to plant. Especially do we want to know what peaches to raise, as, although seedlings are hardy, they will not bring the price. I have sold fine budded varieties at $4 per bushel readily, when seedlings went begging at 60 cents.

Mr. Tice—I think that when we can assign a reason for any particular fact in horticulture, it is best to do so, and as fully as possible. For instance, we know that the Early Crawford is as tender a variety of peach as we have, while Hale's Early is hardy. The Early Crawford has an elongated bud like a grain of rye, and Hale's Early a plump, full bud. All peaches that have the long, tapering bud have the small bloom; whereas those with the plump buds have the large full bloom like a rose. Nearly all our finer varieties are small bloomers, and nearly all of our seedlings are large bloomers, and *therefore* are generally far more hardy than the fine budded varieties, and not because *they are seedlings.*

I differ from Mr. Vories in regard to the killing of the sweet cherry. I think the damage is done in the winter; the wood is frozen and the tree killed, and although it may retain sufficient vitality to sustain it a few weeks, it must ultimately die. I prefer the Mahaleb to the Mazzard stock, for grafting cherries on. The latter will not succeed with any amount of care; but if dwarfed on Mahaleb stock, and protected by shelter, and proper exposures from alternate freezing and thawing, we may hope to successfully grow the sweet cherry.

Mr. Vories dissents from the theory of large blooming varieties being hardier than small blooming ones. It is an ingredient of the germ, which is decomposed in some cases by frost, and in some cases not injured. These are the facts, and whether theoretically right or not, it is the facts we want, and must go by.

Mr. Stewart—My experience with sweet cherries is entirely at variance with Mr. Vories. I have succeeded very well with them, and get a good crop nearly every year.

Mr. Storm—Has succeeded in raising sweet cherries nearly every year on his place in St. Joseph; has only a few trees.

A number of the members expressed their opinions *pro* and *con*, and the majority seemed to be of the opinion that it would do to try a little longer. Mr. Vories, however, predicted that in the next twenty years we would not see that number of bushels of sweet cherries marketed in Kansas City in any one year.

Mr. Reichard—We have some varieties of good cherries that are hardy and productive—among others, the Reine Hortense and May Duke.

Mr. Stewart—I think we can raise seedlings from our present varieties of sweet cherries that will be valuable and hardy. I am making experiments in this direction, and would advise others to do the same.

This opinion seemed generally concurred in.

The Business Committee reported an order of business for the remainder of the session, after which the Society adjourned to meet at 9 A. M., the next morning.

WEDNESDAY, JANUARY 10, 1872.

Meeting called to order at 9:30 A. M., by President Vories.

The committees not being ready to report, the Secretary read an essay by Dr. J. P. Henry, of Independence, Mo., on Fruit as a Diet.

[It was ordered that the essay be filed and printed with the minutes, but I have not been able o obtain it.—*Secretary.*]

Dr. G. M. Dewey offered the following resolution, which was unanimously adopted:

Resolved, That the Secretary be authorized to inquire of the proper authority if the members of this Society can be passed home on the railroads free, or on one-fifth fare, and if it be necessary to telegraph to St. Louis, that he be authorized to draw on the Treasurer for the necessary funds.

The Secretary then read the following letter:

DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C., Dec. 20. 1871.

Secretary Missouri State Horticultural Society:

SIR: By the act of the 2nd July, 1862, Congress donated to the several States a portion of public lands, in the ratio of their population, for the purpose of establishing Agricultural Colleges, thereby evincing a purpose to promote that great interest, through the instrumentality of the respective States. Many Colleges have been, and doubtless many more will be, established. State Agricultural and Horticultural Societies and Boards of Agriculture have also been established by law in many States. A correspondence and consultation between friends of these interests have led to the conclusion that a convention of delegates representing them, for the purpose of conferring upon subjects of mutual interest, would promote the good of all. It has been sugested that I take the responsibility of initiating such a meeting. I therefore propose that each Agricultural College, State Agricultural Society, State Horticultural Society, and State Board of Agriculture, depute two delegates, to meet in convention at the City of Washington, on Thursday, the 15th of February next, to take such action, regarding the interests of agriculture, as they shall deem expedient.

I am, very respectfully,

FREDERICK WATTS, *Commissioner.*

It was then moved and carried that the Society appoint two delegates to the convention to be held at Washington on February 15, 1872. Messrs. Charles W. Murtfeldt and D. L. Hall were elected delegates.

It was then moved and seconded that the financial portion of the Treasurer's report be referred to a committee of three.

Motion carried, and Messrs. Murtfeldt, Dewey and Reichard appointed on the committee.

Dr. John A. Warder was added to the Committee on Fruits on the Table;

Mr. Chase, to the Committee on Revision of the small Fruit List; and,

Mr. Murtfeldt, to the Committee on Wines.

It was moved and seconded that a committee be appointed to revise the vegetable list.

Carried, and Messrs. Stewart, Stayman and Storm appointed such committee.

By unanimous invitation of the Society, Dr. John A. Warder, of Ohio, then addressed the Society.

The Doctor passed some warm encomiums on the fruits displayed on the tables, but said his present hobby was tree planting. He said he wanted to impress on the nurserymen the importance of taking up and propagating the evergreens of the Rocky Mountains, which consisted of five (5) pines, two (2) spruces, and three (3) junipers.

Of the Pines, *Pinus Ponderosa* is the most extended in its range, and is the chief timber tree of Colorado; grows to a large size; is satisfied, from analogy, that it will succeed on richer soils than those of its native habitat. (The Doctor here gave an interesting description of mountain forest scenery.) Another pine found in the mountains is the Gray Pine, (*Pinus Banksiana,*) only useful to any great extent for ornamental purposes. Next in order is the *Pinus Flexilis*, which is found only in the more elevated regions. *Pinus Aristata*, or the "Bearded Pine," is a very interesting tree, and is generally found growing alone, and not in groups as with most pines. It is of slow growth, and is apt to die out in the ends of the branches, giving an antler-like appearance to the tree. Its leaves hold on for sixteen years, and grow very close together. It is *Alpine*, and found only on the most elevated portions of the mountains. *Pinus Edulis*, Pinion Pine, as it is generally called, is found at and south of Pike's Peak. It is distinguished from all other pines by the character of its seeds, which are very large, and comparatively few in the number in each cone.

The Spruces found in the mountains are *Douglassii* and *Menziesii,* and are typical of the Spruce family. The Menzies has the lower portion of its leaves glaucus or white, and is a very beautiful tree. It is called, by the residents of Colorado, the "Silver Spruce," and is found chiefly in the ravines and lower portions of the mountains. The Douglass is still more beautiful, both in tree and cone. From the latter a beautiful fringe is pendant, which gives them a peculiar and striking appearance. Both of these will richly repay those who will gather the seed and propagate them. Do not wait until the seeds are ripe, but gather the cones before ripening, and let

them open of themselves, and they will thus yield all their seed; but if left until ripe, the birds and insects will get the larger portion.

The Firs of the mountains are, *Picea Grandis* and *Picea Englemanii*, both very beautiful; especially the former, which was found on the lower portions of Pike's Peak, about 8,000 feet above the level of the sea, growing with perfect regularity to the hight of one hundred to one hundred and fifty feet. Foliage glaucus underneath, and deep green above, with a crown of cones at the top that hang about like a glory. It was beautiful enough to make some of us forget our desire to climb further up the mountain. It was glory enough for one day.

Of the Junipers, we found several kinds—notably the Red Cedar, which is probably, under favorable circumstances, the most valuable of any to the timber planter. Also, a variety of *Juniper Communis*, with striped foliage, which is in course of propagation, and will probably prove valuable for ornamental purposes. Also, the *Juniper Communis* itself, and the *Juniper Occidentalis*—the latter having been only found in the extreme western range of the mountains.

Of deciduous trees, there are but few in the mountains—two (2) poplars, one (1) maple, one (1) birch, one (1) alder and one (1) oak—and of these, only the poplars can really lay claim to the title of trees. The maple is a beautiful ornamental shrub or small tree, as is also the oak, which is a variety of the white oak.

The Doctor also described at some length the difference between the sylva and flora of the mountains, and the plains and valleys, and their peculiar adaptation to the circumstances which surround them.

Mr. Tice—Did you think the fruit of Colorado worthy of consideration or attention? I think there are some that may prove valuable.

Dr. Warder—With the exception of a few rather inferior varieties of raspberry, currant and gooseberry, I saw no native fruit in the mountains. We rather suspected your party of having eaten them all up on your visit, which preceded ours by a few weeks.

Prof. Swallow—There is a beautiful little evergreen found in the Bad Lands, a trailing Juniper, that will, I think, be a decided acquisition for ornamental purposes. There is also a pine found in the mountains, at an elevation of 7,000 to 8,000 feet, that is very desirable. It is not yet determined what its name is. I think that the Douglass Fir will be the evergreen most easily grown on our dry prairie soils, and its timber is very durable.

The following report was then read by the Secretary:

Your committee on the revision of that portion of the fruit list embracing small fruits beg leave to report the following list:

STRAWBERRIES.

Wilson's Albany, Green Prolific, Triomphe de Gaud, Kentucky, Downer's Prolific, Jucunda, and Iowa.

RASPBERRIES.

Davidson's Thornless, Miami, Mammoth Cluster, Philadelphia, and Golden Thornless.

BLACKBERRIES.

Lawton, Wilson's Early, and Kittatinny.

CURRANTS.

White Dutch, Red Dutch.

GOOSEBERRIES.

Houghton's Seedling.

The foregoing might be much extended, and will not suffice for the amateur, but for market purposes have been about as successful as any with which the committee are acquainted. All of which is respectfully submitted.

U. P. BENNETT,
A. J. STEWART,
A. M. GOODMAN,
G. CHASE,
Committee.

The report was received and declared before the Society for discussion, and the Strawberry List taken up and disposed of as follows:

Wilson's Albany—Retained on list without discussion.

Green Prolific—Retained, after favorable experience from all portions of the State except St. Joseph.

Triomphe de Gand—Retained for amateur cultivation.

Downer's Prolific—Retained for trial.

Jucunda—For amateur cultivation.

Kentucky—Retained for trial.

Iowa—Stricken from list.

Chas. Downing—Added for trial.

Society then adjourned till 2 P. M.

AFTERNOON SESSION.

Meeting called to order at 2 o'clock.

The Small Fruit List was again taken up, and the Raspberry List discussed.

RASPBERRIES.

Davidson's Thornless—Mr. Whitney—Is a hardy and thrifty grower, is thornless, and with me is nearly as prolific as the Doolittle, and several days earlier.

Dr. Dewey—My experience of the variety is also favorable; it is a good berry, early, and productive.

Adopted.

Miami—The question was raised, are the Mammoth Cluster and the Miami identical? Messrs. Richard, Dewey, Bayles, Vories and Hall thought they were. Mr. Chase considers them different, but from his experience thinks there are two varieties cultivated as Miami, one of which is identical with Mammoth Cluster.

Adopted.

Mammoth Cluster—Stricken from the list as being identical with Miami.

Philadelphia—Mr. Murtfeldt—It is the best red berry we have for market. Is grown very successfully in St. Louis county.

Mr. Hall—I consider it much the most profitable raspberry we yet have; is not of first quality, but is hardy, productive, and carries to market well; it requires rich ground and thorough cultivation to produce the best results.

Adopted.

Golden Thornless—Stricken from the list.

Doolittle—Was proposed, and after a short discussion, universally favorable, was added to the list.

Clarke—Added to the list.

BLACKBERRIES.

Lawton—Moved to strike from the list.

Mr. Murtfeldt—I think it should be retained on the list, except, perhaps, for the northern portion of the State; it succeeds very well in St. Louis county.

Mr. Tice—If we strike the Lawton from our list, we shall injure, not the berry, but the Society, for people will plant it. It is the best blackberry we yet have.

President Vories—I have raised a crop of it only once in ten years, and then I gave it protection in the winter. It is of first quality, productive, and continues to ripen for a period of three or four weeks.

Mr. Stark—The Lawton does well in my section, (Pike county,) and though a little tender, bears generally a good crop. The Kittatinny also remains on the bush as long, or longer than the Lawton.

Motion to strike out lost, and moved that the Lawton be adopted for the southern portion of the State.

Carried.

Kittatinny—Adopted unanimously.

Wilson—Stricken from the list.

CURRANTS.

White Dutch—Adopted.

Red Dutch—Adopted.

La Versaillaise—It was moved it be added to the list.

Mr. Reichard—Its general reputation is very favorable.

Mr. Bayles—It is cultivated successfully in St. Louis county; is of good quality, large size, and bears well.

Prof. Swallow—It has succeeded in Boone county.

Adopted.

Question—Can currants be successfully raised in Missouri.

Prof. Swallow—Has succeeded in obtaining a good crop every year, by heavily mulching. Planting under or among trees is also advantageous, or on the north side of a tight fence or a grape-trellis. Several members corroborated these views, and it was the general opinion that, with special attention, the currant migh be successfully cultivated, and, at the present prices, with fair profits.

GOOSEBERRIES.

Houghton's Seedling—Unanimously adopted.

Mr. Parker stated that in Kansas they had a theory, based on the experience of a few years, that by planting out fruit-trees, especially cherries and peaches, and then planting currants and gooseberries between them, all could be successfully and profitably grown for market. It was being tried on a large scale.

The Committee on the Revision of the Grape List reported as follows:

We, the Committee on Grapes, beg leave to submit the following report of varieties recommended:

For Early Market—The Hartford Prolific, Concord and Crevelling.

For Late Market—The Goethe, Catawba, in favorable locations, and Ives Seedling.

For Wine Purposes—Red Wine, Concord, Virginia Seedling, Ives Seedling and Cynthiana.

White Wine—Catawba, Goethe, Martha, Delaware, in favorable locations; Herbemont, for Southern Missouri and favorable locations; Maxatawney, for further trial.

The following list we recommend as promising well:

Rulander, Eumelan, Rentz, Senasqua, Croton, Merrimack and Wilder.

For general cultivation, and for all purposes, we recommend the Concord.

JACOB MADINGER,
GEO. M. DEWEY,
GEO. A. HORNING. } *Committee.*

The report was received for discussion.

FOR EARLY MARKET.

Hartford Prolific—It was moved that it be stricken from the list.

Mr. Murtfeldt—I think it has damaged the cause of grape-culture more than any other variety. It is of poor quality, is put into the market half ripe, and disgusts the purchasers with grapes for the next two weeks to come.

Mr. Vories—I have raised it with profit for many years. It is hardy and prolific. They are generally put upon the market unripe, and are then poor, sour things; but if sent to market ripe, it is a fair grape in quality. I regard it as very valuable for market.

Prof. Swallow—Has had almost the same experience in regard to the Hartford as Mr. Vories. When fully ripe they are a fair grape.

Mr. Reichard—We have no other grape to take its place, coming in, as it does, two weeks earlier than the Concord.

Mr. Murtfeldt—I still think it is not good enough to recommend.

Mr. Bayles—I have marketed Hartfords in St. Louis for several years, and when in the market, *ripe*, side by side with only *colored* Concords, the Concords would invariably sell first.

Rejected.

Concord—Adopted unanimously.

Crevelling—Rejected for early market, but added for amateur culture.

Martha—Added to the list for early market, after some discussion, generally favorable.

FOR LATE MARKET.

Goethe (Rogers' No. 1)—Mr. Bayles does not think that in the vicinity of St. Louis it has proved good enough in foliage for general cultivation, but considers it a good grape, and worthy of further trial.

Mr. Tice—Though a good grape, it is not hardy, and the foliage is so defective that we should not recommend it; does not succeed more than one year in three, except on very favorable soils and locations.

Mr. Horning—It is doing very well in this section. I have fruited it for four years, and consider it our best light grape.

Mr. Reichard—My experience is very favorable. It is nearly or quite as hardy as the Concord.

Mr. Dewey—It is the equal of any variety I know, for healthiness, hardiness and productiveness.

Mr. Vories—My experience is very favorable.

Mr. Hall—I have watched the Goethe closely for two or three years, and have everywhere seen it doing well. Its foliage has a peculiar appearance, but, I think, is healthy. It is very productive, is late, and makes a good wine.

Dr. Warder—It mildews very badly in Southern Ohio.

Adopted.

Catawba—Adopted—for favorable locations.

Ives—Dr. Warder—It is doing very well in Ohio. It is a first-rate light wine grape, healthy and hardy, not good enough for table.

Mr. Murtfeldt—It lost its foliage in many locations last year.

Mr. Stark—Has fruited it three years, and is well satisfied with it for wine, but not for market.

Stricken from the list.

Herbemont.—Mr. Tice—It is to be highly recommended for market and table, but with protection in winter.

Dr. Warder—It is one of our very best grapes. Its hardiness depends much on the training it receives. It is an enormous grower; and if trained to one or two canes they will be as thick as your finger, and consequently soft and tender. The best way is to grow more shoots. They will be smaller and hardier. It can be protected by simply cutting it loose from the stake and laying it on the ground.

Adopted.

WINE GRAPES—RED.

Concord—Adopted.
Virginia Seedling—Adopted.
Ives—Adopted.
Cynthiana—Adopted.

WINE GRAPES—WHITE.

Catawba—Adopted—for favorable locations.
Goethe—Mr. Dewey—It makes a good white wine.
Mr. Horning—I consider it a valuable white wine grape.
Recommended for further trial.
Martha—Recommended for further trial.
Delaware—Adopted—for favorable locations.

These locations were defined as being the same as those suited to the growth of the Catawba, viz: South or south-eastern exposures—soil rich and sandy, loose and friable, and yet capable of retaining moisture.

Mr. Bennett—I have no difficulty in growing good crops of Delawares; my soil is good, not very heavy—exposure south-east.

Mr. Stewart—I grow good crops of Delaware, on the same soil as my Concord.

Dr. Dewey—I have a rich, sandy loam, where no water stands, and so loose that I can, by hand, work a crow-bar out of sight. I cultivate my Delawares thoroughly, and keep them growing late in the season. It, thus treated, succeeds well, and never loses its foliage.

Herbemont—Adopted for Southern Missouri, and favorable locations.

Maxatawney—Adopted for trial.
Rulander— " "
Croton— " "
Senasqua— " "
Wilder— " "
Merrimack— " "
Salem— " "
Eumelan— " "
Rentz— " "

Mr. Sheffield—We have adopted a list of grapes for market and for wine. I now move that we adopt a list of six varieties for family use.

Motion seconded and carried, and the Society proceeded to make a list of grapes for family or amateur cultivation.

Concord—Was proposed, and adopted unanimously.

Delaware—Adopted.

Iona—Proposed.

Mr. Tice—Has succeeded with it. Always protects it, and it then bears regularly and well.

Messrs. Hall, Stark, Reichard, and others, agreed it was a good grape if you got it, but you could not get a crop once in five years.

Dr. Dewey—Had succeeded with it pretty well. Does not let it over-bear. Fruits on the new wood.

Mr. Murtfeldt—One of my neighbors in St. Louis county has a number of Iona vines planted, and has a fair crop every year.

Adopted.

Goethe—Adopted.

Martha—Adopted.

Herbemont—Adopted.

Prof. Swallow—As there seems to be no question before the house, I move we proceed to discuss the bird question. There are some birds that we must destroy if we expect to raise fruit. Among them are the cat bird, the robin, and the Baltimore and orchard orioles. It is not so much the amount of fruit they eat as what they destroy. A single bird will destroy half-a-dozen bunches of grapes in a few minutes.

Mr. Sheffield—Is in favor of importing birds rather than destroying them. They do more good by destroying noxious insects, than they do harm by taking our fruit. The English Sparrow has been imported into some of the Eastern States and cities, and has already rid their parks and street trees of the insects that threatened to destroy them. He hoped to see them brought here before long.

Moved that a list be made of those birds which should be destroyed as destructive to our fruit.

Carried.

On motion of Prof. Swallow, the Baltimore oriole, the orchard oriole and the red-headed woodpecker were declared nuisances.

The Society then adjourned, to meet at 7 o'clock P. M.

EVENING SESSION.

Meeting called to order by President Vories, at 7 P. M.

By request of Mr. John H. Tice, the Secretary read the following preamble and resolutions, adopted by the State Board of Agriculture of Missouri:

WHEREAS, The General Government has organized, for the benefit of commerce and navigation, a Signal Service Corps, and established stations along the Atlantic and Gulf coasts, the shores of the lakes, and at a few points in the interior of the continent, for making certain meteorological observations, namely: Changes of atmospheric pressure, of temperature, and of humidity; the direction, velocity, pressure and force of the wind; cloudiness, rain-fall, etc.; and

WHEREAS, From these data the Bureau makes up a forecast of the weather for the ensuing day, and orders signals of caution and warning to be hoisted along the coast and shores when dangerous storms are approaching; and

WHEREAS, These forecasts are generally verified with remarkable accuracy, and the mariner, forewarned of danger, either avoids it or prepares to meet it, thus saving millions of property from shipwreck or destruction, which otherwise would happen; therefore, be it

Resolved, That the interests of agriculture would be promoted by extending to it the benefit of the observations of the Signal Corps, and that this Board most earnestly recommends to the General Government the enlargement of the area and the sphere of these observations, by extending the system so as to form a net-work of stations at all eligible points from the Atlantic to the Pacific coast, and from the lakes to the Gulf of Mexico.

2. That, in addition to the signal stations for observing the ordinary meteorological facts and phenomena, as now conducted, the interest of science, which is the handmaid of modern civilization, demands the establishment of physical observatories at all suitable points throughout the globe, and their equipment with all the necessary instruments for observing and recording the changes of tension of all the physical forces, and likewise for telescopic and spectroscopic observations of the sun and stars. This Board therefore urges upon the National Government the establishment of such institutions at all points necessary to obtain uninterrupted observations within our own territory; and that it use its influence with all civilized and enlightened nations to establish similar institutions within their bounds, making the same international establishments for the benefit of science, and the enlightenment of all nations, by an interchange of the observations made, thus covering the entire globe by the system, and bringing under constant and unremitted observation all meteoric changes, as well as disturbances of the sun, of the earth, and its atmosphere.

3. That at these international observatories, in addition to making such special observations of meteorological changes as are necessary to forecast, with approximate accuracy, the weather that will prevail for the ensuing twenty-four hours along certain latitudes and in given longitudes, both on land and at sea, a higher grade of general observations should be made of all physical phenomena, electric and magnetic, telescopic and spectroscopic, and carefully noting all solar and telluric perturbations, the time of the occurrence of each, so that if there exist any connection or interdependence between them, the fact may incontrovertibly be established, the unity of cause in all physical phenomena ascertained, and the laws and forces determined by which the universe is governed.

4. That meteorology now is a mass of conglomerate, loose, incongruous and disjointed facts, and that it must remain so as long as the physical facts of the universe are not carefully and exhaustively observed and accurately recorded; for meteorology can only be systematically constructed into a science when universal laws and incontestible truths have been disclosed by studying its elements in the facts of nature, accurately classified and collated.

5. That, though a partial benefit will result, yet a general benefit cannot accrue to agriculturists by furnishing them forecasts of the weather for a day in advance, because it always will be impossible to reach the masses in time to be of any service. But by collecting the facts and

materials out of which to construct meteorology into a positive science, the popular mind can receive such training and education as will enable every one to forecast the weather with sufficient accuracy to answer individual purposes.

6. That this Board recommend to Gen. A. J. Myers, the head of the Signal Service, the convention of the members of the meteorological committees of the several States, as far as appointed, and other scientists, for consultation, and for maturing such plans, and adopting such measures, as will secure the objects contemplated in the foregoing resolutions.

This was followed by an essay by John H. Tice, of St. Louis, on Meteorology.

METEOROLOGY.

MR. PRESIDENT, LADIES AND GENTLEMEN: In treating of Meteorology, to be intelligble, it is necessary to ignore the numerous theories that have been framed for explaining the complicated phenomena that are daily presented in our atmosphere, and which are taking place every hour of the day. These theories have no other basis to rest upon than the vicious assumption that the Universe is a piece of mechanism, which, at its completion, received an impulse that set it in motion for all time to come; and, consequently, that all other motion is secondary, being a resultant of this primitive impulse and an imaginary resisting force, the whole beihg complicated by an adventitious power named heat. The highest aim of these theories is to explain all physical movements on mechanical principles, namely, by the composition of forces; and, as a result, we have a dead, passive universe, instead of a living, active one. Against all such theories I enter a protest, for the reason that they degrade nature, are derogatory to the Divine character, and a stigma upon the the intelligence of the age in which we live.

Led by the glare of the *ignis fatuus* of false philosophy, we have penetrated far into the tangled fens of materialism, and been left standing upon its unfirm quagmires, where the dull, flickering light that betrayed has gone out and forsaken us, and whence every step we take plunges us into deeper darkness and more intricate difficulties. The only alternative for us is to solve the question: how to find our way out to firm ground again from the treacherous footing we now ocoupy. Certainly not by making use of that which led us astray; but we must find our way out as Copernicus did from the disjointed and often vicious fragments of primitive astronomy; as Hutton and William Smith did from the incongruous elements and theories of ancient geology; and as Lavoisier and Davy, in the last generation, did from the ridiculous whimsies of the original chemists; that is, by fixing our eyes immovably upon truth, regardless from what points she emanates, and what havoc she may make with our traditionary theories.

Fortunately, we find already at hand a vast mass of incontestible truths, and even many inductive generalizations drawn from them, by the proper use of which we get some insight into the laws of nature, and the modes of their operation, by which the ever changing phenomena of the physical world are produced.

This is not an occasion for discussing the constitution of the universe; and if it were, there is no time for it. Briefly, however, it may be stated that the universe is constituted of matter and force. Matter has three forms or states—the solid, the liquid, and the gaseous. These forms are conditioned upon the quantity of focre present; the gaseous form containing more force than the liquid, and the liquid more than the solid. If this is not so, then tell me upon what principles you can explain the facts, that when a solid is converted into a liquid, or a liquid into a gas, an immense amount of force, *i. e.*, heat, disappears; and, also the correlated facts that when a gas is reduced to a liquid, or a liquid to a solid, there is an evolution of an immense amount of force. These facts afford not only a verification, but a demonstration, of the proposition, that the state of matter depends upon the amonnt of froce present.

Moreover, the amount of force present in any form of matter is never fixed, but is constantly changing. This modifies that form, and gives rise to the property called density, which, however, is but another name for its relative volume in the given form. For instance, the same quantity of water at 212 degrees of Fahrenheit occupies more space than at 60 degrees; and more at 60 than at 32 degrees. There is a scale of limits for the amount of force, which can not be passed without matter changing its form. For instance, water can not accumulate force above 212 degrees without becoming a gas, nor lose it lower than 32 degrees without becoming a solid. So it is with all kinds of matter. On the ascending scale, there is a point where, if a solid, it becomes a liquid, and if a liquid, a gas; and on the descending scale, at the same point, the gas lapses into a liquid, and the liquid into a solid. Here is the cause of that unrest of matter everywhere visible, and the reason why the physical world is subject to paroxysm.

In the earth these paroxysms manifest themselves by electric currents, magnetic storms, earthquakes, and volcanic actions; in the ocean, by currents, counter-currents and tides; and in the atmosphere by winds, storms, the phenomena of clouds, rain, hail, snow, and electric and cyclonic action.

In meteorology proper, cognizance can only be taken of the behavior of the atmosphere under the constantly changing conditions of its elements, from either the increase or decrease of the force by which they are affected.

Since, always, one-half of the earth's surface lies under direct radiation of the sun, it is evident that the side so situated is accumulating force, while the side enveloped in darkness is losing it. But in every hour of the day the illuminated hemisphere moves west one thousand miles and more in consequence of the rotary motion of the earth on its axis; and the dark hemisphere is moving at the same rate in the same direction. It is, therefore, obvious that in every hour one thousand miles of longitude and twelve thousand miles of latitude are withdrawn from, and a similar extent of the earth's surface exposed to, the direct action of the sun. Hence, not only are the opposite hemispheres, as related to force, in dissimilar conditions, but violent changes are taking place in close proximity to the margins of these advancing hemispheres; that is, in one hemisphere the margin is heating, while in the other it is cooling.

Now, it is a well-kuown fact that no substance whatever can change its temperature at any point without starting electric currents from the heated, or heating, to the cooling point; therefore, neither can the temperature of the earth's surface change without giving rise to currents of electricity; and, since no current of electricity can pass without developing magnetism at right angles to the current, therefore electric currents in the earth must affect its magnetic intensity. The truth of this induction is verified and confirmed by direct observation. There is the phenomenon of the diurnal variation of the magnetic needle. In the twenty-four hours that constitute the day, the horizontal needle makes two excursions west and two east, while the dipping needle, if so fixed as to have absolute freedom of movement, describes an ellipse. These movements of the various magnetic needles are caused by the direction and intensity of the electric currents circulating in the earth.

Moreover, both electricity and magnetism are inductive forces. For instance, no current of electricity can circulate in one body without inducing a current in a neighboring body, but flowing in the opposite direction. Hence, currents of electricity circulating in the earth must induce currents flowing in an opposite direction, in the atmosphere. Here we have an explanation of the causes of the great and controlling fact of meteorology: that within the Temperate Zones the whole atmosphere has a steady and uniform motion from west to east, while in the Torrid Zone the motion is in the opposite direction, that is, from east to west. Observations on cirrhus clouds, in every quarter of the globe, establish this as an incontrovertible fact; since in intertropical regions their movements are always west, and in extratropical regions, east. Hence, all general hydrometeors, that is, rain, hail, snow-storms, and cyclones, are carried forward in the direction of the uniform atmospheric motion as indicated by the cirrhus clouds over the region where they occur—that is, in the Torrid Zone, west; in the Temperate Zone, east. This takes place even when contrary to the wind blowing at the time on the surface of the earth.

There is, however, a peculiarity in the movement of the tropical hydrometeor, which must be known before we can grasp and comprehend the laws and principles of meteorological science. From the moment it appears, instead of pursuing a due west course parallel to the Equator, it gradually deviates from it more and more toward the magnetic pole of its hemisphere. This continues until it reaches the belt of calm near to, or outside of, the tropic. While passing this belt, its course gradually changes until it comes to be at right angles to the Equator; and when the polar limit of the belt is reached, it swings around eastward, deviating in its further progress farther and farther from the Equator. A diagram of its track is, therefore, what a mathematician calls a parabola.

In the Temperate Zones, the rate of motion of a hydrometeor is, on an average, twenty-five miles per hour. In the Torrid Zone, their rate is about eighteen miles per hour, except when accompanied by a cyclone whose circumference may extend from one hundred to three hundred miles from its center; then the rate is slower, and may not exceed eight to ten miles per hour.

There can be no doubt that the great cyclonic storms that arrive in our latitudes from the tropics, and those general storms that sweep within the Temperate Zones, across the entire continent, in their progress, deviate uniformly from the east toward the north. But the course of local storms—that is, thunder-storms and those originating in the center of the continent—is not so well established. It is contended by some that their general movement is at right angles to the magnetic meridian. If this should prove to be correct, then in all that part of the United States lying west

of the Agonic Line, the general direction whence local rain, hail and snow-storms come, will be as many degrees north of west as the declination of the needle is east of north; and in all that part of the territory lying east of said Agonic Line, they will come from a direction as many degrees south of west as the declination of the needle is west of north. In other words, as the declination of the needle at St. Louis is about seven and one-half degrees east, the local storms there would come from a point seven and one-half degrees north of west; and, for the same reason, at New York they would come from a point about four degrees south of west. How it may be at New York, I am not informed; but the facts, as far as my observations go, strengthen the theory as applied to the longitude of St. Louis.

There are two extraordinary facts, to which I called attention now nearly six years ago, which are so remarkable for coincidence in their point of origin, though these are nearly antipodal, and which are in the same magnetic condition, though under the influence of opposite poles, that it would be unphilosophical to say their occurrence is fortuitous. I allude to the fact that all tropical cyclones have their origin on or near the Agonic Lines. Those terrible cyclones, the West India hurricanes, originate in the ocean east of the Caribbee Islands, where the American Line turns south, after making an immense sweep from the coast of North Carolina, north of and around the large islands of Hayti and Porto Rico, passing south over the continent of South America. Likewise, the East India hurricanes have their origin on the Asiatic Agonic Line, where it turns south and passes over the Australian Continent, after an immense sweep from the Persian Gulf, south of and around the large islands of Sumatra and Java.

The West India hurricanes, rising east of that portion of the Caribbee Islands lying east and south-east of Hayti and Porto Rico, commonly known as the Leeward Islands, in their westward course, first strike these islands; and it is a remarkable fact, that the Windward Islands, the southern half of the Caribbee Islands, are exempt from the devastations of hurricanes. They strike the Leeward Islands generally five days in advance of their appearance on the Florida or Gulf coasts. In their westward progress they successively strike Porto Rico, Hayti, Cuba, and then either the Florida or the Gulf coast. As it takes them five days to reach the latter points from the time that they strike St. Kitts and St. Thomas, so their westward progress must be less than ten miles per hour. There is, however, a faster rate of movement, when the cyclone is of small dimensions. As there is now a submarine cable laid to St. Kitts, the approach of a hurricane can be known four or five days before its appearance on our coast.

The immense rain-storm by which they are accompanied often reaches the Lower Mississippi, and even the Valley of the Ohio, although the cyclone, after having struck the coast of Florida, may have swung round and turned its course eastward. It is also a remarkable fact, that when a cyclone is raging on the Florida coast, there is cyclonic action on Lake Erie and intermediate points; and, upon investigation, Lake Erie is found *to be crossed by the Agonic Line*. Cape Hatteras, another point famous for cyclonic action, *is on the same line*.

When cyclonic action manifests itself from the Gulf to the Ohio Valley and Lake Erie, generally a rain-storm from the Upper Missouri comes down from the north-west to meet with and join its forces to those of its tropical brother. When that is the case, wide-spread disaster occurs to the commerce of the Northern Lakes. The atmospheric commotion, for the time being, is confined to the same magnetic meridian, and like an immense wave it rolls along eastward. A general physical disturbance has taken place, affecting the earth, as well as its atmosphere; for while the latter is surging under the influence of an invisible force, the former is thrilled from pole to pole by electric and magnetic storms. Often, in fact, while a cyclone is raging in the air above, the earth is reeling from the throes of an earthquake beneath. Nature evidently is involved in a paroxysm. The equilibrium of the physical forces somehow has become displaced. One physical force has either acquired an excess of tension, or others have become deficient; and this paroxysm is the effort of nature to restore the disturbed equilibrium. The great question now comes up, what is the cause of this physical disturbance?

I have for several years kept a record of physical phenomena, and the dates of their occurrence, in all parts of the globe. It is yet too incomplete to warrant the deduction of physical laws from its facts. But there are so many cases of the simultaneous appearance of the same phenomena, not only in particular localities, but generally at the same time in all parts of the universe, that the unity of their cause can no longer be called in question. I will not restate the remarkable coincidences of the similtaneous appearance of certain solar and telluric phenomena already published to the world, conspicuous among which is the solar outburst of September 2, 1859, instantly followed with intense "Earth currents," magnetic disturbances, auroras and earthquakes all over the globe; but I will confine myself to the humble sphere of my record. Even there the coincidences are so

numerous that they can not all be presented without being prolix. I will therefore confine myself to only two of these, and present only their main features, not all their facts

From about the 12th of October, 1870, to the 26th, the solar disc was covered by not only an unusual number, but extraordinarily large spots. On the morning and evening of October 14th, there was a brilliant fiery-red aurora over North America, Europe and Australia. On the same day a violent hurricane struck the Leeward Islands, reaching Cuba on the 20th, and the Gulf coast on the 21st. The aurora phenomenon, though less intense, continued all this time. On the 20th, the whole of Canada, and that part of the United States lying eastward of the Mississippi and north of the Ohio, were shaken by an earthquake. In Greece, at the same hour, there was a sudden outburst of a brilliant aurora, followed by a violent shock of an earthquake, when the aurora suddenly disappeared. On the 24th and 25th, the aurora was again at its maximum, and observed in both the northern and southern hemispheres. During all this period of twelve days, the whole earth was affected by electric and magnetic storms, and shaken by an unusual number of earthquakes, while from the atmosphere there fell deluging rains, accompanied by hurricanes, tornadoes and waterspouts. The other instance, selected from the record, occurred last August. About the middle of August many sun-spots appeared, which kept increasing in size until the 22d, when they attained their maxima; one of them being then more than 85,000 miles long and 41,000 miles wide. On the evening of the 20th, and morning of the 21st, there was the most brilliantly red aurora of the season. On the 20th and 21st, one of the most destructive hurricanes on record raged at St. Kitts and St. Thomas, accompanied by an earthquake. Many hundreds of people were killed, and some six thousand rendered homeless. In the Bahamas, on the 24th, the hurricane was still accompanied by the earthquake, and it struck the Florida coast on the 25th. On that day cyclonic action manifested itself from Alabama to Lake Erie, and on the following days eastward. Now, while this was taking place in the West Indies and the eastern part of North America, on the same date, 21st, there were earthquakes in Jamaica, Peru, Chili, Hindostan, Burmah, Farther India, and the smaller islands of the East Indies. These paroxysms continued until the 26th, when the earth and the air became quiet again. The cotemporaneous phenomena here are solar disturbances, electric and magnetic storms, auroras, cyclones and earthquakes, evidently having their origin in one and the same ulterior cause. But for the present, as we can not push our investigations further, solar must stand for the proximate cause of telluric disturbances. Hence the necessity, in meteorological observations, to observe the sun and the earth, as well as the phenomena of the atmosphere.

When we look at the unexampled strides of progress made in the nineteenth century, we find that all achievements are based upon a more intimate knowledge of the laws and nature of the physical forces, than was possessed by preceding generations. To name only a few instances: the steam engine, the flying car and the electric telegraph are the results of our familiarity with the properties, laws, modes and nature of heat and electricity. We know how, and under what conditions and circumstances, they will manifest themselves by motion; and hence we have contrived and adapted appliances so as to make them our servants. But when we look abroad into the great universe, we become cognizant of motion on an immense and stupendous scale. What are the causes of this motion, and what are the modes and laws of the forces by which it is effected? This is the boundless field of human inquiry, from which man will draw immense stores of knowledge and power in the future, but which he will never exhaust while time lasts. Our present object contemplates no such extensive scope of inquiry and investigation as the profound secrets of the constitution of the universe, but merely the modes and sources of the forces concerned in the production of telluric and atmospheric phenomena. We want to know the agency by which nature produces these phenomena, as well as the facts how they act afterward. We have a sub-marine cable to St. Kitts, near where the hurricanes spring into being, and therefore can watch them at all intermediate points, observe their action, and study their progress from the sea to the land, and from land to sea again. We therefore have the means, not only of foretelling their advent upon our shores to the very day, but also for unfolding their laws. All this can be accomplished by the humble signal station. Our arrangements are entirely adequate for the purpose of observing the rise and progress of a tropical storm, and of giving warning of its approach.

Our facilities are also complete for warning those living east of the Mississippi River of the approach of continental storms. Stations had only to be established westward, in the interior of the continent, far enough to cover one day's progress of a storm. For making forecasts of the weather for the ensuing day on the lakes and Atlantic coast, it is only necessary to know the meteorological condition and changes at the stations of St. Paul, Omaha, Leavenworth, St. Louis, Shreveport and Galveston. The Signal Service, therefore, is adequate to meet the wants of commerce and navigation.

It is now proposed to utilize its observations for the benefit of agriculture. Ships, and the cargoes they bear, comprise not all the property exposed to the sport of the elements. A winter's storm may fall upon the herds and stock of the agriculturist, and smite them with death, as has already happened this season upon the plains of Kansas. In harvest time, grain, and especially hay, may be damaged, and often utterly ruined, by a rain-storm, whose injury might have been avoided had the farmer only had a few hours' warning of the approaching danger. The value of the service the Signal Bureau can render the agricultural community can not be called in question; but the necessary measures to be adopted to make it available present difficulties. If daily newspapers were published in every agricultural community, the difficulty would be easily surmounted; for then a bulletin of the weather for the day could be laid at each farmer's door every morning. In large cities, where farmers, however, do not live, these bulletins are disseminated every morning, and they can be distributed for fifty or one hundr d miles along all railroads radiating from large cities. But it is evident that the information can reach only a small fraction of agriculturists in time to be of any benefit. Then, again, the most western stations (if we except those of Cheyenne, Corinne and San Francisco, whose observations are not now utilized for any purpose whatever,) are on the western borders of the States of Wisconsin, Iowa, Missouri, and Louisiana. Present facilities are, therefore, not such as to be of any service to agriculturists in the Mississippi Valley. To be so, there must be a net-work of stations spread over the whole western part of the continent. But in doing so, the Bureau men will acquire a mass of facts for which they have no explanation. At least such is the inference drawn from their pamphlet, which says:

"A slight acquaintance with the weather map brings to our notice the fact that barometric hights, as reported from Mount Washington, Cheyenne, and other very elevated stations, even after all allowances are made for altitudes, are very different from those at neighboring stations, which are more nearly on the sea level."

Signal stations along the crest of the Rocky Mountains, and on the plains along their base, would force on the Signal Bureau the solution of the meteorological problem they present From personal observation, made on these mountains last summer, I am satisfied they exercise a controlling influence on the meteorology of the Western plains, and consequently have a modifying influence on that of the eastern half of the continent. Therefore neither the meteorology of the Mississippi Valley, nor more or less that of the Atlantic slope, can be understood thoroughly until the modifying effects of the mountains are determined.

But the extension westward of signal stations will introduce the Bureau to another new system of facts that will exact of it an explanation. These are the periodic winds that steadily blow, almost a gale, for the six summer months north, and for the six winter months south. During two months, from the latter part of June to the latter part of August, on an average of one day in seven, this gale is a sirocco, heated as though it came from a furnace; and from the first week in January to the first week in March, on an average of one day in a week, it is an Arctic blast, sweeping south, which neither man nor beast can withstand. The mechanical cause of these periodic winds is well understood: namely, for six months low barometric pressure in the Upper Missouri Valley, and, during the same time, high barometric pressure in the western part of the Gulf of Mexico. In winter these conditions are reversed. But what is the cause of the semi-annually high and low pressures at the given points? And why should they be so located as always to produce atmospheric motion parallel to the mountains? Evidently, the mountains exercise an agency in the matter.

Again, in the belt swept by these periodic gales, originate all the small local storms that sweep eastward to the seaboard during summer. Now, what are the meteorological conditions of this belt, or of these winds, when they become the digesters of thunder-storms? At present neither science nor the Bureau can answer.

It is thus evident that more extended observations must be made to collect a large amount of facts; and then an immense amount of pains-taking labor must be expended to collate these facts, together with the highest order of brain-work to digest and explain them, before meteorologic science is so far advanced that bulletins can be prepared for the daily use of farmers.

But why should the knowledge thus accumulated become the monopoly of a favored few, to be doled out in dribs to the uninitiated common people? In this, as in all other matters, the masses must think for themselves. The time for oracles is past, never to return. Society no longer is kept from harm by leading-strings in the hands of priests, prophets and kings. All men are endowed, at least in degree, with the same faculties, capacities and powers, mentally and physically. There is, then, no foundation for the dogma that one man must do the thinking for another, or any room for one man to arrogate superiority over another. Nature lays no foundation for

such distinction. From what cause, then, do such distinctions arise? Simply from the different culture men receive. Since culture makes this difference, all men have a right to receive it. If any man, by a course of training and culture, can attain to so intimate a knowledge of the intricate laws of nature, and of the mode of their operations, as to enable him, within limits, to foretell what will happen in a definite future time, then all men have a right to such high culture; for knowledge is the birthright of all. Meteorology must, therefore, as soon as the requisite materials are ready, be systematically constructed into a science, and introduced and taught in the people's colleges, the common schools. Then each one, with his barometer, thermometer, anemometer and hygrometer in hand, can forecast the weather with sufficient accuracy to serve all personal purposes.

It has already been stated that the advent of a tropical hurricane can be foretold five days in advance of its appearance on our coast. Great and continental storms can be foretold for fully as long a time. Storms, on account of the uniform eastward movement of the atmosphere, are carried from the Mississippi to the Atlantic, at the rate of about thirty miles per hour. From the Pacific to the Mississippi their average rate is less, because they are much retarded while crossing the Rocky Mountains. It takes them, on an average, five days; therefore, if a general rain along the Pacific Coast is announced, as it generally is during the winter, you may be sure that in five days it will reach the Mississippi. All these facts show that the elements of meteorologic science exist, and that they need only to be patiently observed, and accurately recorded, to be made available in constructing the science systematically.

Ordinary rain-storms, unless unusually heavy, are not preceded, accompanied nor followed by marked electric and magnetic disturbances. They are, however, often preceded, accompanied and followed by auroras. But tropical hurricanes are invariably synchronous with general electric disturbances, extending more or less to the whole earth. Now, if atmospheric and telluric disturbances are synchronous with sun-spots, and other solar out-bursts, then we can predict disturbances in the earth by observing those of the sun; and therefore, in addition to signal stations to observe ordinary meteorological phenomona, we need physical observatories, for observing the whole train of facts and causes, namely, the physical phenomena of the controlling body of our system, the sun. Science, which is the handmaid of civilization and progress in our age, demands that the out-posts of knowledge should be advanced into the dark and unexplored regions of the unknown. Physical observatories, for making telescopic and spectroscopic observations of the sun, and for recording its phenomena, together with taking observations and recording those subtle and ever-changing forces, electricity and magnetism, by which our earth is constantly affected, will be out-posts of science in the right direction.

At no time is our whole territory under a cloud. While the sun in the Mississippi Valley is hidden by clouds, it is generally clear on the Atlantic slope, on the Rocky Mountains, or on the Pacific coast; and when it is clear in the great valley, clouds may cover the sky in the east or far west. The Rocky Mountains, however, are famous for the general clearness and brightness of the sky, as well as for the transparency of the atmosphere. These observatories should be distributed over our territory from east to west, and from our northern to our southern borders, so as to secure at all times, without failure, at one or more points, a cloudless sky for making observations. If the Government will take the matter in hand, it can, to a great extent, make existing scientific institutions available, by merely providing the instruments and paying the observers.

This is an undertaking that lies entirely beyond the limits of individual enterprise. Eight or ten observatories will be necessary; this will require means. When the observatories are established, then the observations must be systematically made, and according to a definite plan; this will require a competent and responsible head to direct them.

But when these observatories cover our whole land, the observations on the sun can only, on an average, extend to twelve out of the twenty-four hours of the day. But the sun should be under continued surveillance. These institutions must, therefore, be carried around the globe, and into the southern as well as the northern hemisphere. This can only be done by concerted action among all enlightened nations; and when this concert of action is had, observations must be conducted according to a general plan, systematically observing and recording the same facts. A faithful transcript of the records should be annually exchanged between the nations parties to the convention, for their mutual benefit, and for scientific investigation.

At first blush it may appear a Herculean task to effect this concert of action; but the difficulties are only apparent, not real. Russia now has physical observatories extending from the Baltic, through Siberia, to the Sea of Ochotsk, in Eastern Asia, where thermal, electric, magnetic, barometric, etc., observations are daily made. Germany, and all the principal nations of Europe, have theirs for similar purposes, including, in addition, telescopic and spectroscopic observations of the

sun. England has similar institutions at home, and abroad at Cape Town, in South Africa, in Hindostan and in Australia. The co-operation of these nations is all that is needed to complete the plan of continuous and systematic observation. In fact, the greatest difficulty in the enterprise will be to enlist our own nation in the cause.

Ours is a government of the people, and our theory is that governments were instituted among men to secure the blessings of life, liberty and the pursuit of happiness. When, therefore, anything is to be done to secure these blessings, which lies beyond the sphere of individual effort and enterprise, beyond the ability of single States, it is the duty of the General Government to undertake and achieve it; and it is the right of the people to demand its accomplishment. Let the people then demand that this great and far-reaching measure be adopted, and above all, let science, which is of no nation, kindred, tongue or people, demand it in the interest of civilization, enlightenment, progress and humanity, and the thing will be done.

NOTE.—In this essay, out of deference to the general scientists, I have assumed a uniform motion of the atmosphere eastward in the temperate zones, and a westward one in the torrid zone. I, however, do not wish to be understood as committed to that theory, since there are too many difficulties in the way to its acceptance. My present views are, that instead of a real atmospheric movement, it is only an electric wave that develops itself in our latitude, eastward, and within the tropics, westward, producing motion of all the elements of the atmosphere toward this moving point of development.

On motion, the paper was received and ordered published with the proceedings of the Society.

The subject of "Drainage" was brought up, and opened by Prof. Swallow, who said that undoubtedly thorough drainage is one of the most necessary and profitable operations of agriculture over a large portion of the globe. It must, however, be proved to be *both* profitable and necessary, before you can induce farmers and others to practice it to any great extent. Many portions of Missouri *must* be drained in order to make agricultural pursuits profitable with them. The greatest apparent advantages from thorough under-draining are, comparative immunity from drouth, and a marked decrease of injury from excessive moisture. The Professor continued his remarks at some length, amply illustrating and sustaining the positions he had taken.

Mr. Salisbury—What would be regarded as thorough drainage in this section of the country?

Prof. Swallow—Three feet deep to the top of the tile, and drains thirty to fifty feet apart, would do in most soils. But for the cost, it would be better to go deeper. Three feet will be deep enough, and will be the most economical. The more shallow the drains, the nearer they must be together.

Mr. R. J. Lewis—Another reason, not yet mentioned, presents itself in favor of drainage, viz: The stopping of the wash on our limestone or mulatto soils, and thus preventing the rapid loss and consequent deterioration of such soils.

Mr. Reichard—Can any drainage be profitably entered into in soils that are so light and porous that, with a spade alone, we can dig down twenty or thirty feet—such soil as we have at Kansas City and St. Joseph in many places?

Prof. Swallow—I am not prepared to answer that question definitely. I have traced the root of a pokeweed in a cut at Kansas City down perpendicularly seventeen feet to where I broke it off. I doubt if it would pay to drain in such soils.

Mr. Hall—Will not tile-drains, laid in orchards, invariably fill up and be destroyed by the roots?

Prof. Swallow—Probably they will, but in most locations the benefits of draining, to an orchard, would pay for opening them again. The difficulty can also be partially if not wholly remedied, by making one end of the tile larger than the other, so that they shall lap over.

President Vories and Prof. Swallow each made some earnest and practical remarks on the necessity and duty of making farming fashionable—of making it the object of education, instead of, as at present, sending the sharp boys to the professions and the store, and the supposed idiots to the farm. Prof. Swallow gave some examples from his own experience of the difficulties thrown in the way (both by example and advice) of agricultural education, by the very men who ought to do all in their power to sustain the efforts now being made at our Agricultural College.

This was followed by remarks from Lewis Reichard, and others, all strongly advocating the cause of agricultural education. Among other ideas advanced, was the necessity of the country furnishing the city with new supplies of brain and muscle, to renew the constant waste of both the intellectual and physical forces, ever occurring in the city.

On motion, bills to the amount of $13, in favor of the St. Joseph Printing Company, for printing programmes of meeting, and of $3.25, in favor of D. L. Hall, for express charges, etc., on reports and books, were ordered paid by the Treasurer.

Mr. J. A. Storm, of St. Joseph, introduced the following:

Resolved, That a committee of nine shall be appointed, whose duty it shall be to visit, in their respective Congressional Districts, County Fairs, Horticultural Societies, and fruit-growers generally, and who shall have the power to forward, at the expense of this Society, such specimens of *new* fruits, seedlings or otherwise, as may be found in their respective districts, to the best pomologist in the *West*, for his examination, and report thereon; which shall be sent to the Secretary for compilation, to constitute the basis of a report to this Society at its regular annual meetings.

2. The persons representing their respective districts shall act in co-operation with the Vice-Presidents of said districts, and shall pay especial attention to and recommend such fruits as are best adapted to their localities, and, so far as possible, a description of soil and aspect shall be included in said reports.

3. The persons representing each district shall be elected annually, by the members of this Society. Said person, however, shall be nominated by the members whose district he represents; provided, that in case any district is not represented at the annual election of a member to serve therein, the President shall have the power to appoint one.

The resolutions were received and made the special order for the next morning session.

The Society then adjourned until next day at 9 o'clock A. M.

WEDNESDAY, JANUARY 11, 1872.

MORNING SESSION.

Meeting called to order at 9 o'clock A. M.
Mr. Geo. S. Park read the following paper on

CLIMATOLOGY OF THE MISSOURI VALLEY.

MR. PRESIDENT, LADIES AND GENTLEMEN: In presenting some observations on the climatology of the Missouri Valley, I must ask your indulgence. Business cares have prevented me from making that research the subject demands; for it involves a general scientific knowledge of creation. All that I hope is that the observations and suggestions I may make will be considered by the philosophic minds of this Society and of this assembly, and practically utilized.

OCEAN CURRENTS.

In order to understand the causes that affect our climate, we must examine the whole earth. This globe, revolving from west to east with immense velocity, carries with it the atmosphere and the waters of the ocean. But, like the waters on a whirling grindstone, there is a flowing back, from a failure to keep up and to restore the vacuum. These are called equatorial currents, and flow from east to west, when not obstructed by continents. The motion of the earth being greatest at the equator, decreasing to nothing at the poles, causes the currents to be greater at the equator, and the water, flowing along each side, rather draws to it. Except when obstructed by continents, they form return currents in the temperate zones to fill the vacuum caused by the waters drawn off by the currents.

Commencing in the tropics, on the west coast of South America, the equatorial currents move westward, about three miles an hour, across the broad Pacific Ocean, striking the shoal coasts of China and Japan, carrying moisture to fill their great rivers and fertile elements to feed their uncounted millions. The Kurwo Siwo, or Japanese Gulf Stream, there turns to the north-east along the coast, bending in the temperate zone toward our north-west Pacific coasts. The northern edge of this current, cut off by the Alaska Islands, pours its warm current through Behring's Straits into the Arctic Ocean. Thus with currents and mountains the Pacific coast is completely shielded from polar cold. But the main current of the Japan Gulf Stream, with dark, tepid waters, dashes against the coasts of Washington and Oregon, carrying its climatic influences up the Columbia River, and across the head-waters of the Missouri to Dakota. Its tempering influence is very perceptible in the valleys of Wyoming and Montana, especially those that run east and west. Fort Benton, in latitude 48°, has a milder and more equable climate than Albany, New York, in latitude 43°. It will be seen that these great currents, and the winds that follow them, not only temper the climate of the great mountain regions at the head of the Missouri, but cause the deep snows that fall there to feed the great rivers of our continent. From Oregon the current turns down the Pacific coast, and its influence is not felt so far eastward. The general line of Pacific influence eastward may be drawn by a line through Pembina, Fort Kearney and San Antonio. Occasionally the Gulf influences swing round, and, meeting, give unusual rains and snow-storms to the plains and mountains, but their normal condition is mildness and dryness.

Let us now go back to China, and follow the other branch of the equatorial current that turns south and enters the Indian Ocean. Flowing across it at the rate of two miles and a half an hour, t strikes the coast of Africa off the Mountains of the Moon, giving to the Nile its flood. It then turns south through the Mozambique Channel, and, doubling the Cape of Good Hope, it again reaches the equator in the South Atlantic, off the Gulf of Guinea. Gathering the waters of the Niger, it flows westerly at the rate of two or three miles an hour. Its southern rim is cut off by Cape St. Roque, and turns south along the South American coast till it meets the cold Antarctic currents and beats them back, carrying them eastward to South Australia and the Pacific Ocean,

thus shielding our south-west currents from Antarctic cold. But the main current passes along the South American coast in a north-westerly direction, and, gathering the great floods of the Amazon and the Oronoco, the mighty current sweeps on through the Caribbean Sea at the rate of two-and-a-half miles an hour, and enters the Gulf of Mexico, through the Yucatan Channel, in a deep stream, seventy-five miles wide; turning again westward, apparently to find an outlet to the Pacific, it enters the bay of Campeachy, and, circling round the Gulf, takes in the waters of the Mississippi, raising the Gulf some fifteen feet higher than the Pacific. These heaped-up waters form a great seething, whirling eddy of hot, blue waters, the Almighty's great steam manufactory, which raises the vapor that rises and floats north to water the valley of the Mississippi. The portion of these heaped-up waters not exhaled and carried northward finds an outlet in the Gulf Stream, twenty-five miles wide, off Florida Cape, and running at the rate of five miles an hour; thence it strikes off across the Atlantic to the shores of Europe, giving them warmth and fertility.

The present object in tracing these currents is to show their effect upon the climate of the Missouri Valley. We shall hereafter show that the controlling atmospheric currents carry these vapors over the Missouri Valley. It will be seen at a glance that Asia and Africa do not entirely cut the ocean currents. They pass around Cape Romania, in Asia, and the Cape of Good Hope, in Africa. But Cape Horn extends too far south, so these great ocean currents are entirely cut by North and South America, and dammed up and turned northward, throwing their tropical influences over the valley of the Mississippi. What a wonderful provision for us: the great equatorial currents that have flowed around the globe and gathered all the fertilising elements of the tropics, heaped up in the Gulf of Mexico, and, by a combination of forces, to throw their rich exhalations over this great valley. O, I have watched with delight the dark clouds come rolling up from the Gulf in the spring, and, after a genial shower, seen the flowers bloom and the grass spring up as if by magic, and thanked God for these beneficent influences. David saw them long ago; inspiration gave to him an intense and vivid sense of God's works in their greatest, noblest aspects. He briefly said, in the clearest and fittest language, which modern style cannot equal:

"He heapeth up the waters of the sea,
And layeth up the depths in storehouses."

How truly hath God heaped up the waters of the sea and laid up the ocean depths in these eternal storehouses to water and fertilize the great Valley of the Mississippi—the last best gift of God to man, where the great final struggles of advancing humanity are to be made, and the highest achievements of man attained.

We will next consider the atmosphere and its currents.

ATMOSPHERE.

We are surrounded by a peculiar substance, gaseous, expansive and compressible. It is rarefied by heat and contracted by cold. When heated, it rises, and when cooled, it settles down, if under the same pressure. It is a substance: it has weight. It holds invisible aqueous vapor in solution; miasma mixes with it; unseen and contagious diseases float in the air along with its invigorating and life-giving principles. Plants require air, and leaves are their lungs, which expire and respire, and they wither and die when deprived of air. Most plants draw their substance from both earth and atmosphere. But the hyacinth will grow and bloom in the air without earth, if its roots are in water. But the air is even more necessary to animal life. We can live but a few moments without it. It is the breath of life. At birth it is the air that starts the whole physical and mental machinery into motion and continues it. The psalmist wrote, "By the word of the Lord were the heavens made; and all the *Host of them* by the *breath of his mouth.*" The atmosphere is highest at the equator, and of greatest volume. Cold air is heavier than warm, under the same pressure, and displaces it. The general law of the atmosphere, then, is for the cold air to rush from the poles to the equator, and the warm air at the equator to rise to cooler hights and flow back toward the poles to fill the vacuum, and, after being frozen and purified by the cold and variable winds of the north, to return again in veins of strata to the equator, freed from every material impurity, rectified, pure and exhilarating, to give health and vigor to man. At the equator again, the atmosphere gathers fertilizing elements, warmth and moisture, and courses north to dispense these beneficent influences.

"How manifold are thy works, Lord God Almighty!
In wisdom hast thou made them all."

This general law of atmospheric movements is affected by other causes; among them is the revolution of the earth, which is most rapid at the equator, and declines toward the poles. This makes the equatorial currents, in their passage north, reach us as south-west winds, and the polar currents reach us as west winds. Hence our coldest winds are from the west, and warmest from the south-west. Again, the weight of the atmosphere compresses it near the earth, but it expands like a sponge, as you rise, and the pressure is less. A cubic yard of atmosphere, near the earth, would expand, at the hight of eight miles, to eight cubic yards; and the eight cubic yards expanded would contain no more heat than the one cubic yard at the earth. This elastic expansion of atmosphere, in upper stories, as the pressure ceases, prevents the cold currents, thus expanded, from descending suddenly to the earth and destroying its fruits. The cold spell of December 24, 1870, is a case in point. Records kept by our careful friend, Mr. Salisbury, at Kansas City, show that the thermometer ranged here, on that day, from 6° to 8° below zero; while along the northern base of the Ozark Mountains, two hundred miles south of here, it ranged from 18° to 23° below zero; consequently, most of the peaches were killed in the neighborhood of Rolla, while a fair crop matured in this section.

In April, 1870, we had severe frosts about the middle of the month, which did great injury to the fruit crop. These late frosts were probably caused by an abnormal pressure in the region of Baffin's Bay, forcing a cold surface current down over this section.

Heat rarefies the atmosphere and causes it to rise. The cold air, being heavier, rushes in to fill the vacuum. This is another cause of our variable winds. The direct rays of the sun, and their radiation from the earth, heat and rarefy the atmosphere, and are powerful agents in evaporating moisture, producing local showers, winds and sudden atmospheric changes. The expansive power of heated air is tremendous. We see it in the power of steam, in the explosion of boilers, and in the tornado.

The sun, that great transparent body of apparent mineral, melted and dissolved with fervent heat, whose flames of transparent, luminous vapor flash through its atmosphere for millions of miles, has its path from north to south. He is king of the walk, and knocks about all lesser influences at will. He will come northward, ripening grains and fruits, or bringing rains, at the rate of fifteen miles per day, till the 20th of June, when he will turn his path southward. Electricity, too, has some agency in producing atmospheric changes. In the prairies of Southern Kansas, I once noticed a sudden change from piercing cold to mildness, without any change of wind, which I could then attribute to no other agency but electricity. Its operation is instantaneous and all-pervading.

Our atmosphere is about forty-five miles high; above that, later discoveries make it probable there is an equable temperature. The starved Frenchman, soaring in balloons above the Prussian guns and the clouds, contrary to his expectations, found a milder temperature than below. May not the friction of rays from innumerable suns have this effect? O, what is there in illimitable space?

Last winter, the north-east portion of our country was visited by severe snow-storms, owing to cold currents of air and ocean, driving down Baffin's Bay from the polar regions. These north-east storms are light here, and seldom reach farther than Southern Kansas.

This year cold weather commenced with severe snow-storms in the Rocky Mountains about the middle of November, and continued with little intermission near six weeks. These snow-storms are probably owing to the return currents of the Japan gulf stream, and the atmospheric currents carrying the vapor high over the Coast Mountains to the Rocky Mountains, and a westward range of the gulf currents in the upper regions, when some abnormal pressure in the Arctic Ocean, or Baffin's Bay, forces a cold surface current which drives over the mountains and plains of Texas.

When this condition prevails, it is usually the longest and severest of the season. During the cold Sunday night, December 3, warm cirrus clouds were passing rapidly to the north in an upper current, while the under-current coming rapidly from the north was extremely cold. Last winter was generally mild. We were plowing in February.

AIR-CURRENTS—WINDS.

We have described the ocean currents, and the atmospheric currents flowing between the equator and the poles; but the revolution of the earth also causes other great and controlling atmospheric currents. This is represented and shown by the north-east and south-east trade winds of the tropics, and the return trade winds of the temperate zones. By looking at the map of the Western Hemisphere, we find the temperate and torrid zones traversed by lofty mountains from the north-west to the south-east—from the mouth of McKenzie's River to the Straits of Magellan—so high that atmosphere, freighted with vapor, seldom passes over them. The whole vapor-

bearing atmosphere of the equatorial regions, in its flow westward, is arrested by the Cordilleras and turned northward. The heavy south-east trades from the Cape of Good Hope and the South Atlantic, following the great ocean currents, back the north-east trades and make their way through, over the Caribbean Sea and Gulf of Mexico, to Texas; here Æolus opens his bags and lets drive. Planting his feet against the western spurs of the Ozarks, he swells his pouting cheeks and blows, and blows, and blows; plants and trees turn and bend to the north-east, like a ship streaming before the gale. These winds, after circling the globe, turn and bear to us the luxuriant richness of tropical atmosphere. Talk not of Italian climate, or Idumea's spicy breezes! There is nothing milder, balmier, softer, pleasanter, than our south-west winds. Here we feel its influence more than three-fourths of the year. Indeed, it is the normal current; for there is much more atmosphere at the equator to flow than at the poles.

Our cold currents of air from the north usually last but a short time, and are often tempered by return currents of warm air that have passed over us.

Old Sol, not content to leave the swelling of aerial alone to the moon, retains the powerful forces of heat and motion, and over the loftiest mountains rolls the gigantic waves of this great, unbroken atmospheric ocean. Heat, terrestrial radiation, currents, moisture, magnetism, atmospheric waves, and the revolution of the earth, cause different local pressure and variable winds. Notwithstanding this, our leading currents are from the Gulf. They bring the fertility of the tropics. The hills of Cuba and St. Domingo have retained their fertility for centuries; and tropical forests ever glow with unwonted luxuriance. See how the grass grows, the flowers bloom, and the grain springs up, after a southern shower; then go to Maine, and see the blasting effects of a north-easter from the polar currents. There is, of course, not the same warmth, but there are not the same elements of plant-growth, either in the rain or atmosphere. Our rich soil may not all be owing to drift, but in part to the fertilizing atmosphere, and rains from the tropics, which have also caused a luxuriant vegetation that, decaying, has accumulated humus for ages.

We find the same great operations in the Gulf; the same hot ocean current, the same heated vapor rising from the "Tierra Caliente" west of the Antilles, and flowing rapidly north; the same depths of ocean, heated by internal fires, boiling, seething and dashing against the northern shores of the Gulf of Mexico; and the same superior force of south-east trade winds driving north over the valley of the Mississippi, the effect of all these influences — same as Columbus found it more than three hundred years ago—and we now believe these mighty influences will last forever.

Had the ocean currents found a passage through the Isthmus — had the Andes been leveled in the tropics, so the atmospheric currents could have passed freely to the Pacific — the Gulf Stream would have been cut off, and our south-western current turned away, then the civilization of Europe would have been frozen out, and the Mississippi would have been dried and uninhabitable.

RAINS ON THE PLAINS.

The western line of general rain currents has been through St. Antonio, across the Solomon, and through Fort Kearney, north. But during the last two years it has ranged farther west, and the Great American Desert begins to be talked of as a myth, among the things that were. If these rain currents continue to extend west, over the plains, the time may yet come when the sites of those ancient cities of the south-west, now buried in arid sands, may again revive, and bloom with fruits and flowers. God's eternal storehouses, where he has heaped up the waters and laid up the depths, are sufficient.

While these rain clouds have parted with so much moisture in their western transit that swung round over the United States, light showers and drouths have prevailed east of the Mississippi.

The belt of rain clouds usually extends from the Gulf of Mexico to the Piney Hills north-west of Lake Superior. On the east side of this belt easterly winds blow toward the storm center. In the center of the rain belt the winds were southerly, and the currents of vapor were gushing up from the Gulf, and the rain is light or heavy in proportion to the width and intensity of this central condition, and the return polar currents, that come as west or northwest winds, strike the western rim of this storm belt with great force and swing it round eastward over the United States. These rains, commencing on the Missouri, in a few hours go pattering over the Mississippi, and on to the Atlantic.

THE WEATHER BUREAU.

The establishment of the Weather Bureau is one of the wisest measures of this Government. But we look for still further improvement. The weather indicates the crops, and the crops indicate what the weather has been. Our cereal products, our grasses, the rot and mildew of grapes;

the blight in pear trees; the yield of fruits; and the health and comfort of man, all depend upon the weather. Were the telegraph established in every postoffice, so we could get dispatches at cost, much good might be done. For our weather is often affected by forces operating in distant parts of the world.

The vast level plain, open to the North Pole, extending from the mouth of McKenzie's River to Labrador—a distance of 80° of longitude—has a climatic effect upon the Mississippi Valley. It sometimes sends down a cold wave to blast our fruits. Were a line of stations established from Alaska to Labrador, our frosts and snow-storms might be forecasted, so the cattle growers of the plains and Texas and the mountains could prepare food and shelter for the stock to meet such emergencies, thereby saving millions. The great snow-storms which commenced about the middle of November and continued with little intermission for six weeks, have filled some of the mountain valleys near fifty feet deep, and swept the mountains and plains from Montana to Texas. Many lives were lost and thousands of cattle frozen. Lulled to security by the unusual mildness of the winter, the cattle men were not prepared. These great abnormal storms may originate in the North Pacific or the Arctic Ocean, where the warm currents through Behring's Straits meet the polar currents, or in Baffin's Bay, where some unusual pressure may force a cold under-current down over the plains and mountains, or the upper currents of our Gulf influences may have moved higher over the mountains, while the surface was swept by cold polar currents. These storms have affected our climate, and the cold has been unusually steady. But on the 22d of last December, low dark cumulous clouds turned the western hills of the Ozark Mountains in the Indian Territory, while dark cumulo-stratus clouds rose slowly over their eastern ridges, and the lurid lightning flashed along their low summits, and the deep-toned thunder announced the rainy conditions south, and the coming supremacy of tropical currents from the Gulf. The probabilities are that the heart of winter is broken. An occasional cold wave from the north may pass down over us, and it may freeze sharply for a few days, but the normal condition will be the supremacy of tropical currents. On the 29th of December the atmosphere was mild, and the aspect of the heavens, when the sun was setting, was most lovely! No soft Italian skies were ever more beautiful! Can a winter's day be more pleasant and delightful than Monday, the 8th? We have many such winter days. We have but few fogs in the Missouri Valley. Our nights are free from that damp chilling so prevalent farther east.

Some local influences may produce miasma and cause unhealthiness. But the searching winds, penetrating everywhere, and the flow of atmospheric currents to the poles, and their return purified, are great and wonderful provisions made by the Almighty for the health of the people of the Mississippi Valley. Our young men are well gotton up, and our young ladies are fair, with a little red on their cheeks. Indeed, our young people possess energy, health and vigor equal to any in the world.

RECAPITULATION.

Among the many agencies that affect our climate, we sum up, in conclusion, some of the leading ones we have considered:

We have shown that the equatorial currents, after circling the globe and gathering rich elements, pour their hot, blue waters through the Caribbean Sea into the Gulf of Mexico; steaming with vapor that floats over to water and fertilize the Mississippi Valley.

We have noticed the veins and strata of atmosphere, flowing to the poles under a general law, and returning purified and health-giving.

We have seen the trade winds circling the globe, and bearing the luxuriant richness of a tropical atmosphere, suddenly arrested by the lofty Andes, and turned northward over the Mississippi Valley.

We have seen the superior force of the south-east trade winds, coming from Africa, and the South Atlantic, along the ocean currents, beat back the north-east trades—carrying them through the Caribbean Sea, and over the Gulf of Mexico, and on to the Missouri River, bearing the richest elements, and the warmth of tropical airs and oceans, to temper our climate, to fertilize and fructify this great land forever; thus giving our people the benefit of tropical rains and atmosphere, without the enervating effects of tropical heat.

We have seen the path of the sun north bring the needed rains in May, June and July, to grow our vegetables, grains and fruits.

We have seen the sun's declination south in August, September and October give us dry, soft and mellifluous south-west winds to perfect the flavor of our fruits. Was ever more done for any people?

Thus we see God in the winds and water—the air and earth—not distant, but ever present; a fellow-worker with man, in bringing forth the fruits of the earth. We are only working with

God, when we cultivate the earth, and raise our grains and fruits. But the spirit of God not only moves in nature, but in the human heart; opening an overflowing fountain of moral excellence and goodness, where all may drink who will, and feel and know the divine glory.

Our faith and hope for the future are in the ever active presence of God with man and nature.

Seneca, I believe, said there is but one good—knowledge; and but one evil—ignorance. This is true so far as working the moral and physical laws of the Creator are concerned. We must know the laws to apply them, and work in harmony with nature and with God, and *"Labora:e est Orare."* To labor is to pray.

O, thou Creator of men! the maker and builder of worlds! we thank thee from the depths of our hearts for the provisions thou hast made for the people of this land—a land fairer and broader than Palestine—a land that drops fatness—that flows with wine and oil—with milk and honey. Grant us, thine husbandmen, skill and wisdom to co-operate with thee in preserving this rich inheritance thou hast given us for ourselves, for our children, and our children's children forever.

On motion, the paper was received and ordered published with the proceedings.

The next business in order being the

ELECTION OF OFFICERS

For the ensuing year, Messrs. Stewart and Sheffield were appointed tellers.

The following resolution was unanimously adopted:

Resolved, That the resolution providing for one term only of officers be cancelled, in order that the Society may be at liberty to re-elect tried and trusty men.

The following officers were then elected:

H. M. VORIES, St. Joseph	*President.*			
CHAS. PEABODY, St. Louis.	*Vice-President,*	*1st*	*District.*	
NORMAN J. COLMAN, St. Louis	"	"	*2nd*	"
ALVA CULVER, Ste. Genevieve	"	"	*3rd*	"
F. F. FINE, Springfield	"	"	*4th*	"
F. A. NITCHY, Jefferson City	"	"	*5th*	"
GEO. S. PARK, Parkville	"	"	*6th*	"
A. J. STEWART, Chillicothe	"	"	*7th*	"
O. H. P. LEAR, Hannibal	"	"	*8th*	"
WM. STARK, Louisiana	"	"	*9th*	"
DANIEL L. HALL, Kansas City	*Secretary.*			
JOHN H. TICE, St. Louis	*Treasurer.*			

The resolution of Mr. J. A. Storm was then taken from the table, put, and unanimously adopted.

The following resolution was then adopted:

Resolved, That the Treasurer of the Missouri State Horticultural Society be and hereby is instructed to pay the actual expenses of the delegates who were appointed to attend the convention called to meet at Washington, D. C., February 15, 1872, provided that the said expenses shall not exceed the sum of one hundred and fifty dollars to each delegate.

Mr. Charles H. Mansur offered the following resolution, which was unanimcusly adopted:

Resolved, That the heart-felt thanks of this Society are due, and are hereby tendered, to Hon. Jno. F. Wielandy, of Cole, and Hon. R. S. Moore, of Livingston, for their earnest efforts in securing the annual State appropriation we now enjoy, as also to all other members who supported the same.

Hon. J. F. Wielandy said he felt honored by the resolution just passed. He had only done his duty in the matter. It was now a permanent appropriation of $1,000, and would doubtless remain so. He

stated that our thanks were also due to Mr. Charles H. Mansur, who drew up the bill, and used his influence in getting it passed.

President Vories said he fully appreciated the efforts that had been so successfully made for our appropriation, and observed that it was fortunate that men had been found who were not only willing to do their duty, but who understood it; and said he fully indorsed the resolution just passed, and also the recognition of the efforts of Mr. Mansur.

Mr. Mansur gave an explanation and history of the difficulties in the way of the appropriation, and said that the financial affairs of the Missouri State Horticultural Society were now on a good footing, and likely to continue so.

The Committee on Fruits on the table then reported, through Dr. Jno. A. Warder, as follows:

To the President and Members of the Missouri Horticultural Society:

We have had great pleasure in examining the noble fruits displayed upon the tables. They are just what we might have expected when we know of the great advantages possessed by this region of our country, in climate and soil, and especially in your pristine condition, with respect to those pests of the orchard, which were following in the footsteps of the careless orchardist—the insects injurious to fruits. In a new country, among the native plants, there are insects in abundance, some few of which are injurious to the crops of the horticulturist; but some of our worst enemies have been imported from abroad.

When once introduced, it has been observed of many insects that they increase with wonderful rapidity wherever their proper food is provided in abundance, because, forsooth, we introduce an insect by our commerce with other regions, but, in our ignorance, we leave their natural enemies behind them. Man is ever interfering with the beautiful arrangements of the Creator, commonly called the laws of nature, and he should lay the blame of the results upon his own shoulders rather than to impugn an all-wise Providence, as he is so apt to do, in his unwillingness to blame himself for all the ills that flesh is heir to. It is so with his horticultural operations; and whether his evils are attributable to climate, to exhaustion of the soil, or to the ravages of insects, we may ever take the blame as the result of our own misdeeds.

So here, with your fertile soil, so well adapted to fruit culture by its rich provision of the needed elements of plant food, with your favorable climate, and, more especially, with your having stolen a march upon the insects that infest the older orchards of the Eastern States, you have, as here exhibited, most noble specimens of the finest fruits.

Let us not, however, count too confidently upon our long-continued immunity from these pests, nor for an indefinitely prolonged extension of the favorable conditions to which we have referred. The insects and diseases will one day be among us, and we must be up and doing with our best efforts to countervail these evils. We can no longer plead ignorance. The evils have been pointed out, and the remedies may be provided. We are proud to point to the valuable services of our State Entomologist, and feel thankful to our rulers for their wisdom in providing for us so excellent a teacher of the people upon this important department.

To return to our apples. It might be unfair to specify some, where all are so fine of their several kinds; and yet we find some sorts that are of uncommon excellence, and, as their producers are chiefly unknown to your committee, we need apprehend no jealousies among the fruits themselves.

The Janets are just such as we used to see in Ohio and Kentucky when that variety was there in its prime. The Pryor Red is here shown in as great perfection as ever it was seen in its favorite Kentucky and Virginia orchards. That pomological puzzle of Western students, the White Winter Pearmain, is here shown in size and beauty exceeding anything we have ever beheld elsewhere. The large striped Pearmain, or McAffee, is here in all its glory, and perhaps in two or three varieties, all resembling one another very strongly, but perhaps differing somewhat in quality. That old favorite, the Yellow Newtown Pippin, is here admirably perfect, and, if prolific, should be a prime favorite. But we can not now specify all the varieties that attracted our attention in this exploration. The Winesap seems to be pre-eminently a successful fruit in this region. The Smith's Cider, Ben. Davis, Willow, Limber Twig, Red Winter Pearmain, and some others, besides those already named, seem to be well regarded as valuable orchard fruits.

NEW VARIETIES.

Of these we find several, some of which are unknown beyond their own original limits, and therefore it may be premature to express an opinion of their future value. Some of them, however, will be named. The General Lyon, which in its character resembles the Minkler, promises to be as good a keeper, and to be valuable for commercial orchards. The Park's Keeper, if it prove, as supposed, to be really different from the large Striped Pearmain, and a better keeper, as it promises, must become very valuable. But the Lawver, as a large, fair and handsome fruit, of good keeping and market properties, seems to us to bid fair to become a valuable addition to our orchard fruits. Several others were presented of which further acquaintance is desirable.

In these remarks, we desire to remind the Society that in such a report as this it has been our desire to err rather on the side of caution than enthusiasm; hence we may have failed to satisfy the expectations of some ardent fruit culturist: *Festina lente* is a safe motto for fruit men, as for other enthusiasts.

Respectfully submitted by the Committee:

JNO. A. WARDER,
JNO. A. STORM,
GEO. S. PARK,
} *Committee.*

The Committee on Wines made the following report:

The Committee on Wines beg to report that they have performed the duty assigned them, and the accompanying memorandum is the result of their examination.

The Committee beg leave to remark that only about one-third of the samples presented were mature wines, upon which it was possible to pass an intelligent judgment. The remainder were musts of last year's vintage, some still in a state of fermentation, but all immature, upon which we can only pass a judgment as to what they will be when ripe; and the grading attached is to be understood as a mere expression of opinion as to their merits in that respect, and not as wines, which they are not yet, and will not be, until matured.

JOHN H. TICE,
WM. M. KING,
J. P. REICHARD,
} *Committee.*

WINES GRADED.

WHITE CONCORD.

No. 37.....	Jacob Madinger.....	St. Joseph.....	1869	Grade	7
No. 20.....	G. A. Horning.....	Westport	1871	"	10
No. 9.....	H. Clagett	Gray's Summit.....	1870	"	8

RED CONCORD.

No. 36.....	Jacob Madinger.....	St. Joseph.....	1868	Grade	9
No. 25.....	H. M. Vories.....	St. Joseph.....	1871	"	5
No. 21.....	H. M. Vories.....	St. Joseph	1869	"	7
No. 8.....	H. Clagett.....	Gray's Summit	1870	"	10

Nos. 22, 23 and 24—H. M. Vories; 32, 34 and 35—Jacob Madinger; 50 and 51—Jas. Skinner; 2 and 11—H. Clagett; and 15—G. Horning, not graded by the Committee—all Concords.

CATAWBA.

No. 13.....	G. A. Horning.....	Westport.....	1871	Grade	6
No. 1.....	H. Clagett.....	Gray's Summit.....	1871	"	7
No. 4.....	H. Clagett.....	Gray's Summit.....	1871	"	5
No. 14.....	G. A. Horning	Westport.....	.....	"	00
No. 38.....	Jacob Madinger.....	St. Joseph.....	.....	"	00
No. 28.....	Unknown	.....	.....	"	00
No. 29.....	Unknown.....	.....	.....	"	00

NORTON'S VIRGINIA.

No. 30.....	Dr. Dewey.....	Keytesville	.....	Grade	8
No. 18.....	G. A. Horning.....	Westport	.....	"	7
No. 19.....	G. A. Horning.....	Westport	.....	"	5
No. 33.....	Jacob Madinger.....	St. Joseph..	.....	M'ldy	.....
No. 31.....	Dr. Dewey.....	Keytesvrlle...	.....	"	.....
No. 7.....	H. Clagett.....	Gray's Summit.....	1870	Grade	8
No. 5.....	H. Clagett.....	Gray's Summit.....	1870	"	7
No. 26.....	H. M. Vories	St. Joseph.....	1870	"	5
No. 3.....	H. Clagett.....	Gray's Summit.....	.....	"	00
No. 12.....	H. Clagett.....	Gray's Summit.....	... ..	"	00

IVES SEEDLING.

No. 10.....	H. Clagett.....	Gray's Summit.....	New	Grade	9
No. 40.....	J. Stayman.....	Leavenworth, Kansas.....	"	"	8
No. 39.....	J. Stayman.....	Leavenworth, Kansas.....	"	"	7

GOETHE.

No. 16.....	G. A. Horning.....	Westport.....	New	Grade	8
No. 17.....	G. A. Horning.....	Westport	"	"	9

The following report of the Committee on the Revision of the Apple List was then read by the Secretary:

Your Committee to Revise the list of Apples for general cultivation would respectfully submit the following:

SUMMER.

Early Harvest,	Golden Sweet,	Early Strawberry,
Red Astrachan,	Carolina Red June,	Keswick Codlin, (for cooking.)

FALL.

Maiden's Blush,	Fameuse,	Fall Wine,
Fall Pippin,	Rambo,	Milam.
Porter,	Fulton,	

WINTER.

Ortley,	Rawles' Janet,	Winesap,
White Winter Pearmain,	Little Romanite (for late mkt.)	McAffee Nonesuch,
Huntsman's Favorite,	Yellow Belleflower,	Willow Twig,
Ben. Davis,	Red Canada, (for North Mo.)	Rome Beauty.
Jonathan,		

W. E. McBRIDE,
A. J. STEWART,
JOHN H. TICE, } *Committee.*

The report was received and taken up for discussion, and each variety adopted or rejected separately.

SUMMER VARIETIES.

Early Harvest—Mr. Tice—It is valuable for family use; but in St. Louis county does not bear enough for market purposes.

Mr. Lewis, of Jackson county, Mr. Vories, of Buchanan county, Mr. Mansur, of Chillicothe, and several others, stated that in their localities it was an abundant bearer, and very profitable. Mr. Wielandy, of Cole county, stated that it was somewhat slow in coming into bearing; but that should not be considered a fault, as it was more sure to make a thoroughly matured tree, which is as essential as a healthy tree.

Adopted.

Carolina Red June—Mr. Lewis thinks it is not advisable to multiply varieties, and inquired if there was enough difference between it and the preceding variety, except in color, to make it valuable. The universal opinion seemed to be that it was very valuable, especially from its habit of being a long time in ripening.

Adopted.

Red Astrachan—Adopted (for cooking.)

Early Strawberry—Mr. Stewart—It is a uniformly good bearer with me, and I regard it as very valuable.

Mr. Reichard thought there was much confusion in the names; several very different apples being grown under the name of Early Strawberry. Moved to strike from the list.

Which was agreed to.

Golden Sweet—Stricken from the list.

Kenwick Codlin—Adopted (for cooking.)

Sweet June—Added to the list.

FALL VARIETIES.

Maiden's Blush—Messrs. Hall, Stewart, Reichard and Stark were of the opinion that it was by far the most profitable of our fall

varieties, and could not be dispensed with. Mr. Wielandy, and others, were strongly in favor of it.

Adopted.

Rambo—Adopted after some considerable discussion.

Fall Pippin—Adopted unanimously.

Fulton— " "

Porter— " "

Fall Wine— " "

Fameuse— " "

Milam— " "

Sweet Bough—Added, for family use.

WINTER VARIETIES.

Ortley—Adopted.

Yellow Belleflower—Considerable difference of opinion seemed to exist in regard to this variety. Some considered it very unprofitable, others thought it valuable.

Mr. Tice had never succeeded in raising a crop; thinks its success depends on the location. It frequently drops its fruit badly.

Dr. Warder—I think the general habit of the tree is not to drop its fruit; but on rich bottom soils it is an exceedingly slow bearer. I should select for this variety, hard clay ridges, where it will not grow so persistently, and the difficulty will be overcome. It is not a strictly winter apple in most locations, but is never in its best condition until winter.

Mr. Wielandy—I think it can only be considered a fall apple in Missouri.

Mr. Salisbury—It is one of the most valuable varieties in my orchard. Does not drop its fruit, and is healthy and vigorous.

Mr. Stewart—My experience is favorable. I have trees twelve years old, that have borne good crops for three or four years, and last year a very heavy crop.

Mr. Horning—I cannot succeed in making it bear. My trees are more than twelve years old.

Mr. McBride has trees twelve years old, that bear only tolerably well. My old trees do better.

Mr. Wielandy—The soil has much to do with apple bearing. On the magnesian limestone soils of our county, (Cole,) all varieties were this year breaking down with their load of fruit.

Adopted.

White Winter Pearmain—Adopted.

Red Canada—Mr. Stewart—It is a profitable variety with me; one of our best winter apples.

Adopted (for North Missouri.)

Huntsman's Favorite—Although a new variety, the general experience was entirely favorable. Messrs. Stark, McBride, Reichard and others spoke very highly of it.

Adopted.

Winesap—Universally admitted to be the most profitable apple cultivated in Missouri.

Adopted.

Ben Davis—Adopted (for market only.)

McAffee Nonesuch—Mr. Reichard and others stated that the tree was not hardy—blights badly.

Mr. Stark—It has not succeeded very well in our section.

Mr. Wielandy considers it valuable. My experience with it is very favorable.

Adopted.

Jonathan—Adopted.

Willow Twig—Messrs. Murtfeldt, Stark, and others, considered it a valuable variety.

Adopted.

Rawles' Janet—Adopted.

Rome Beauty—Mr. Stark—It has been grown in Pike county for twenty years; it is a good second-rate apple; it goes into market in the spring in good order; it makes a better tree than the Winesap; it sells better and bears better; will not keep so well, and is not of so good quality.

Adopted.

Gilpin, (Little Romanite)—Messrs. Wielandy and Hall stated that it is not a long-lived tree. Messrs. Reichard and McBride seemed to think it was. All agreed as to its poor quality, and also that it was profitable on account of its long keeping.

Adopted (for market only.)

Sweet Romanite—Added.

Adjourned until 2 o'clock P. M.

AFTERNOON SESSION.

Meeting called to order at 2 o'clock P. M.

D. L. Hall, of Kansas City, read the following essay:

THE MISSION AND MANAGEMENT OF HORTICULTURAL SOCIETIES.

BY D. L. HALL, KANSAS CITY, MO.

To those who have watched the development of horticulture in the Western States during the past few years, it is very evident that great progress has been made in all of its branches; and even those whose attention has not been turned directly toward horticultural pursuits, have only to look

at the evidences everywhere present in the orchards, the vineyards, the gardens, and the markets of the present day, and contrast them with those of a dozen years since, to convince them that a decided advance has been made, which, if not all that has been hoped for, and at times expected, is still sufficient to make us inquire by what agencies so much has been already accomplished, and by what means we may compass still further improvement, and finally hope to attain the great object of our labors—a perfect, pleasant, and profitable system of horticulture.

Before considering this question, however, it may be pertinent to inquire: What is horticulture? This question, often asked, has been answered in many different forms, but perhaps never better than by President Peabody, in his annual address before this Society in 1868, when he says: "In a word, horticulture embraces the pursuit of all kinds of culture which either directly or indirectly will please the eye or gladden the heart, or add to the rural adornments of our homes." President Flagg, in an address before the Illinois State Horticultural Society, defines horticulture as "a nicer, or more careful culture, as distinguished from the rougher arts of the field;" and adds: "It may be called the poetry of farming, while agriculture is its plain prose;" and divides it into—

First—Useful, comprising Fruit-growing, Vegetable or Market Gardening, Tree-growing and Nursery culture.

Second—Ornamental, comprising Ornamental Tree-planting, Flower Gardening and Landscape Gardening.

Third—Scientific, comprising collections of Fruits, Trees, Vegetables, Flowers and Plants, made not so much for profit or ornamentation as for experiment, and to gratify a scientific taste.

These definitions cover, I think, the entire ground; and, assuming them as correct, they show us the great scope of horticultural pursuits, and at the same time serve to assure us that not only has considerable progress been made in horticultural science, but that its objects and capabilities are comprehended by some of its professors, and, with proper efforts in the right direction, may be made plain to all. By what means, then, have we attained the present condition of horticultural knowledge in the West as compared with that of a few years since? By what means can we make still further progress, and what agencies are best adapted for the greatest advancement of horticultural interests?

In the past, undoubtedly, many agencies have contributed to the results we claim to have gained. The love for horticulture and horticultural pursuits, directly or indirectly, in one shape or another, is almost universal, and waits only for a favorable opportunity to develop itself. The first settlers in a new country have no time, means or energy to devote to our "poetry of farming," but must, of necessity, content themselves for a considerable time with the "plain prose;" but as means and leisure increase, the tastes for fruits and flowers revive; the memories of the apples and the cider of the old home, return with new force, and the pioneer farmer plants an orchard; it may be small at first—perhaps only a few seedlings—but, gradually increasing in number and value his horticultural possessions, and by his example stimulating his neighbors to do likewise, he becomes, to some extent, an horticulturist, and thus the first step of the useful in horticulture is attained.

In the meantime, the ornamental, or, as I prefer to call it, the beautiful part of horticulture will not have been neglected. The good woman of the farm will have a few flower seeds sown, a few shrubs set out, and a little garden patch reserved, each small at first, as with the orchard, but a nucleus about which may be formed that dearest spot on earth—a rural home. A certain degree of age and prosperity, then, is necessary to a section of country before developing any great degree of horticultural success.

Another great agency in horticultural progress has been the personal efforts and example of those enthusiastic lovers of the science who, devoting their entire attention to it, are always in the advance, are discouraged by no failures, deterred by no labors, but by systematic experiments, followed by practical results, freely imparted to their friends and neighbors, encourage others to "go and plant a garden."

Still another powerful instrument in the diffusion of horticultural knowledge is the press, especially the agricultural or rural press. Its influence can not well be overrated, and it needs no eulogium from me.

The pecuniary success of horticulturists, in special branches, and at various times, has doubtless had a large influence in drawing attention to horticultural pursuits. The returns of judicious management and culture have been liberal in the past, and we hope and believe will continue so in the future.

Many other causes could be mentioned that have contributed to the development of horticulture in a greater or less degree, but we pass them by to turn our attention to the great agency,

doing, as we claim, more than any other to advance horticultural interests, to develop horticultural ideas, and to elevate and perfect horticultural science: The Horticultural Society—an agency which, we are confident, has in the past few years accomplished, directly and indirectly, more than all other means combined, and, its mission comprehended, and its management properly attended to, is capable of doing more in the future.

We claim this because the other agencies of horticultural progress are, in a great measure, the offspring of, and resu't from, the labors of the Horticultural Society. The men whom we look up to as teachers of horticultural science gained many of their ideas, and much of their knowledge, from experience given, or words spoken, in the debates of the Horticultural Society. They are its graduates, so to speak, and the results of their labors are communicated, to a large extent, in its sessions.

The horticultural press stands in nearly the same relation. Its choicest paragraphs and best ideas are often gleaned from the reports, debates, or essays, of the Horticultural Society; and the pecuniary successes of practical horticulturists have, through the medium of these societies, gone broadcast through the land, and stimulated and encouraged the pursuits of horticulture for commercial purposes, while the not less reliable records of their failures have served to avert the losses and mistakes to which all enterprises are liable.

That the Horticultural Societies of the present time are, in number, efficiency, and in nearly all respects, superior to those of even a few years since, can be denied by none who have watched their progress and development. That their mission is comprehended by a large number of intelligent horticulturists, in all sections of the country, likewise admits of no doubt, and the excellence of the management of some of them is fully attested by their continued prosperity, wide-spread reputation, and the great practical good that has resulted from their systematic efforts to promulgate and extend horticultural knowledge.

Nowhere is there more need of practical horticultural knowledge than in the West, and while we have, in this section, some of the best and most energetic societies to be found in the country, they are yet "few and far between;" the great majority of those organized being of very limited influence, and only accomplishing a small part of that good, both to their members and the community at large, of which they are capable. Knowing these facts to be true, and knowing also the rapidly increasing importance of Missouri as a fruit-growing State, and believing that great benefits might accrue from a systematic and well-directed management of Horticultural Societies, to be located in all sections of the State; and believing, furthermore, as must every horticulturist, that an era has arrived when only intelligent cultivation of fruits, conducted economically, and on sound business principles, can hope for success; I have ventured to take the subject indicated by the title of this paper in hand, not because I consider myself able to instruct this Society on either its mission or management, but in hope that the subject may attract attention, and provoke discussion, and thus, perhaps, produce some ultimate good.

First, then, let us consider what is the mission of the Horticultural Society. As I conceive it, the main objects are—

First—To awaken a more extended interest in Horticultural pursuits.

Second—To diffuse correct Horticultural knowledge.

Third—To encourage such a union of interests among horticulturists as will enable them to reap the full results of their labors.

Fourth—To encourage a love for the beautiful, by directing attention to and cultivating a taste for the ornamental as well as the useful branches of horticulture.

These objects, briefly stated, cover, I think, a wide field of usefulness; and I propose to take up each separately, and see by what system of management they can be best accomplished.

To awaken a more extended interest in Horticultural pursuits. This object can be accomplished by—

1. Publishing the proceedings of all meetings of the Society, and distributing them as widely as possible. This is undoubtedly one of the most efficient ways of extending the circle of influence of the Society, and will tend largely to increase the interest of members in the meetings, for experience has proven that wherever a Society has regularly published its proceedings, in whatever form, its numbers have increased, its papers and reports become more valuable, and its reputation and influence as a center of horticultural information established. The manner of publishing is, of course, important. The first, and generally most feasible way, is through the columns of the local papers. This is always desirable, and will secure the attention of those whose interest the Society will naturally most wish to obtain, and so far is good. Next to this, and equal in importance, are the agricultural and horticultural papers. These are always willing to publish all proceedings of general interest, and whatever may be good and practical will be read with interest

by a larger number, and commented upon, and whatever is erroneous will be likely to be exposed and corrected. In addition to one or both of these means, whenever the condition of the Society will warrant the expense, is the publishing of the proceedings each month in pamphlet form, furnishing each member with one or more copies, and distributing the others widely over the country. This is somewhat expensive, and can onty be afforded by well-established Societies, in locations where the experience of members and the extent of horticultural interests make the proceedings of the Society of value and interest to a large section of the entire country.

2. By exhibitions of horticultural products at all meetings of the Society, and by public exhibitions at least once in each year.

The value of horticultural exhibitions is well established, and will need no argument in its defense. It is the most important means of awakening an interest in horticulture; we may talk to men by the hour, day after day, write to them by the column week after week, and unless they have some previous interest or acquaintance with the subject, they do not appreciate it; but take them into a hall filled with fine fruit, beautiful flowers, or well-grown vegetables, well arranged, correctly named and tastefully displayed, and you place something tangible before them, something that appeals at once to both the head and the heart, something that each can appreciate, no matter how ignorant of the method of production; and we venture to assert that none ever visited a first-class exhibition of fruits and flowers, without feeling an increased interest in horticultural products, an increased respect for horticulturists, and an increased idea of the value of Horticultural Societies, and formed a determination to, at some time, and in some degree, indulge in horticultural pursuits.

In order to make a good public exhibition, however, the Society itself, or rather the members of it, must be trained and educated by exhibitions of fruit, etc., at all their meetings; each member should consider it a duty to bring in specimens of his products from time to time, that varieties may become familiar, errors of names corrected, and the best methods of arranging specimens understood. Premiums should be offered, not for the largest specimens, or greatest collections merely, but for those collections of fruits, flowers and vegetables that shall be most suitable and valuable to the district where they are produced, and for such individual specimens as shall best represent their variety, and are therefore best adapted to promote an acquaintance with the different varieties.

3. By making the meetings of the Society of social interest, and thus inducing a larger attendance.

Experience, as a member of several societies, has proven that wherever the presence of ladies at the meetings is encouraged and invited, they will come, and that their regular attendance adds largely to the interest of the meetings, and induces a much larger gathering. It is well known, however, that ladies are, as a rule, averse to going to meetings held in offices or public rooms; in fact, it is next to impossible to get them to attend at such places. I am, therefore, in favor of the "itinerant system," as it may be termed: that is, holding the meetings of the Society at the homes of members. The best and most flourishing societies in the West have adopted this mode. They have rapidly increased in influence, and their meetings are looked forward to with interest, and the day looked upon as the monthly holiday. I am cognizant of an Horticultural Society, in this immediate vicinity, whose meetings were attended by very few, sometimes not more than half a dozen, but which, in adopting the system of meeting at members' homes, found their attendance increased ten-fold, and the interest and value of the proceedings far superior to those of any previous meetings. At the annual meetings, and perhaps during the winter months, it may not be of so much importance; but certainly during the summer season, when trees, flowers and plants are in all their glorious beauty, meetings held among these true horticultural surroundings must far surpass, in interest, any that can be held within the compass of brick and mortar. In short, I am convinced that boarding around is the best system of horticultural meetings yet devised.

4. By assigning to each member such duties as shall make him take a personal interest in the proceedings of each meeting. This can be accomplished by means of standing committees on various subjects, of which every member shall be appointed to at least one, and by declaring it the duty of each committee to report in some sort at each meeting.

To diffuse correct horticultural knowledge—

1. By promoting a uniform and correct nomenclature.

Nothing in the range of horticultural knowledge would seem of greater importance than a uniform and correct nomenclature. At the present time names are multiplied, localized and mixed up, until frequently the same fruit is called by a dozen different names in as many different localities—sometimes by the name of an entirely distinct fruit, but oftener by a name of local origin—which leads to an apparent multiplicity of varieties, where none really exists, is the cause of morti-

fying mistakes in the setting out of orchards and plantations, and in various other ways makes "confusion worse confounded." Therefore, it is one of the most important duties of an Horticultural Society to establish a standard of nomenclature by which all its proceedings and papers shall be governed, and make it an unvarying rule to correct erroneous names wherever found in its jurisdiction. This may be accomplished by taking some standard authority, as Downing, Warder, and others, as a guide by which to settle all disputed questions; and also, by appointing a committee, composed of the best posted members of the Society, to especially act in such matters.

2. By collecting and distributing specimens, scions, seeds, etc., of such fruits, flowers, and other horticultural products, as may be thought valuable, and by weeding out and rejecting such sorts as may be found worthless, and also by experiments in various directions.

This, another important duty of the Society, can be accomplished in various ways: By making the Society an agent by which to secure to members their share of seeds and cuttings, annually distributed by the General Government and by the State societies; by encouraging the exchange of such varieties as may be possessed by members; by appointing committees, to experiment in various directions, as to the value or worthlessness of new and untried sorts, and by keeping accurate records of such experiments, to be published from time to time with the proceedings.

3. By encouraging the sciences directly connected with horticulture, in order that the conditions of success or failure may be better understood. To this end, committees on entomology, botany, ornithology, meteorology and climatology should be appointed, who should take especial cognizance of all that relates to horticulture in their respective departments. That on entomology should make collections of beneficial and noxious insects, that they may be easily recognized, sending those new or unknown to the State Entomologist, or some other capable person, for identification and information; keeping record of the operations of those already known, ascertaining the modes of prevention against the injurious species, and reporting the results of their labors each meeting. That on botany will find its proper sphere of action in obtaining and reporting information in relation to the habits and growth of the various departments of plant life, and the conditions at which trees, plants, buds or fruit are most liable to be affected, favorably or unfavorably, by extremes of heat or cold. That on ornithology may study the habits of birds, gathering the statistics of benefit or injury done by them, and pointing out those which should be protected, and those, if any, which should be destroyed.

The Committee on Meteorology should keep and report accounts of the range of the thermometer, barometer, etc., and inquire into such other matters as come within the range of their science, and are likely to affect horticultural pursuits.

That on Climatology should pursue their particular branch of science with the same end in view, and all should make their reports regular, practical and to the point, and, as far as practicable, applicable to the season.

4. By short, practical papers on Horticultural topics, to be read at the meetings of the Society. Subjects for discussion should be selected for each meeting, to be opened by a practical essay, and the topic, whenever practicable, should be one applicable to the season; thus "Tree planting," or "Varieties to plant," should be selected for the winter and spring essays, while the culture of the various fruits, flowers and vegetables can be best discussed when specimens to illustrate them, and prove the opinions advanced, can be obtained.

Our next head—To encourage such a union of interests among horticulturists, that they may be enabled to reap the full results of their labors—is a practical and important one; and the Society, by keeping members fully posted on the markets for horticultural products, of the causes likely to affect them, will enable them, by proper organization and mutual support, to guard against losses, and regulate the markets to better advantage.

Probably no class of men have paid less attention to the proper organization of reliable market reports, of the probable ratio of demand and supply, and of the measures necessary to prevent an excessive supply at any one point, than horticulturists; and especially is this true of the more perishable fruits, which are frequently either totally lost or sold at unremunerative prices. Here, then, the Horticultural Society can accomplish a practical work, and do a vast amount of good to its members, by uniting them for the purpose of mutual information and harmonious action, and thus they may be better enabled to regulate the supplies by more equally dividing them. Of course, the methods of accomplishing this will vary with the circumstances, as a local, or distant market, etc., etc. Also, by collecting and compiling horticultural statistics, with a view to obtain data from which to form reliable estimates of the wants and capabilities of the country over which the influence of the Society may extend. This seems to me to be an important feature of the Society's sphere of action; these data, properly arranged, would be of great value to those searching after locations in which to establish any branch of horticultural pursuits. For instance, those wishing

to make timber plantations would be able to select the points most likely to be profitable and successful for that specialty; those wishing to manufacture wine and cider would be enabled to get an idea of where to locate; and buyers of fruit and vegetables would know who to go to for their supplies. In order to make this data of full value, it should be sent to the district or State Society, and published in its report. This object of practical benefit to all concerned will be still further carried out, by discussing the best and most profitable varieties of fruits, flowers, and vegetables; the most profitable way of training and raising them; the best methods of gathering and preserving, and of packing and shipping them; and the most successful ways to manufacture wine, cider and vinegar, and to preserve fruits and vegetables.

There has been, and still is, much difference of opinion as to the value of extended lists of fruits, vegetables, etc., but I am inclined to think that, carefully prepared, and no varieties allowed to be put in without actual trial, these lists may become of great value, even if we allow that in the State Society we can not make a list of much practical value, because those fruits suitable to one soil and climate may not be to another; and I am inclined to think the objection good. This will not be so with the local society, as their territory will extend only over a comparatively limited country, so that what is suitable to one location will, with few exceptions, be suitable for all. I would, therefore, recommend that careful lists be made, and revised from time to time. The various modes of planting, pruning, trimming and training our orchards, vineyards and plantations will always afford profitable fields for discussion, and none are so perfect in their horticultural knowledge as not to be able to profit by the ideas and suggestions of their fellow-members. The best ways of canning and preserving fruits and vegetables, the process of wine and cider making, will also be pleasant and profitable themes. In a community where commercial horticulture is practiced to any great extent, no topics will be of greater interest than those of picking, packing and marketing the products of the orchard and garden, for frequently the difference between a profitable or disastrous crop lies more in the successful marketing than in the raising of it; and in no point connected with our profession have we more to learn than in this, nor can we in any way learn better than by profiting by the experience of others, unless it is by our own experience, which in most cases is very expensive. Here, then, the Horticultural Society has a legitimate field of labor of the highest practical importance.

Much more might be said on the useful portion of the subject, (as distinguished from the ornamental,) and yet leave the subject far from exhausted; but time will not permit me to dwell, and we will now turn for a brief consideration of the higher mission of the Horticultural Society: the encouragement and cultivation of the better part of human nature; of that love for the beautiful which is inherent in every heart, and is never entirely stamped out, and manifests itself in the solitary flower in the cottage window and in the elegant conservatory of the wealthy; that plants the few evergreens and shrubs in the city lot, and employs and encourages the highest degree of horticultural skill on the banks of the Hudson or the Mississippi, and finds one of its highest manifestations in beautiful lawns and flower-beds, and the soft outlines of waving trees; that builds up our rural homes and plants the city park; that crowns with flowers the festivities of life, and decorates and beautifies the resting places of the dead. While the practical questions of our calling, to which we have called attention, are an important part of the business of the Society, this, its *moral* mission, is still more important, and vastly more extended and far-reaching in its results—a mission to be accomplished by encouraging this love for the beautiful, by elevating the public taste, and, through it, the public morals; and by teaching the workers in the more practical branches of the profession that the highest mission of that profession is to learn him to take a "look through nature up to nature's God."

How the Horticultural Society may best labor to further this mission, I will not attempt to dictate, but merely give a few hints as to some of the means that most readily suggest themselves:

First—By encouraging the cultivation and exhibition of flowers—those beautiful forms that appeal at once to "gladden the eye and please the heart" of all to whom they present themselves; whose cost is so insignificant compared to the pleasure to be derived from them, and some of which can be grown in any soil, however poor, and in any climate.

In order to encourage their growth, lists should be made of the flowers most likely to succeed, best adapted for certain purposes, and most easily obtained; seeds should be collected and distributed, exhibitions of flowers at all meetings encouraged by being taken due notice of, and, if practicable, by offering premiums for the best collections during the season; this course will have the effect of bringing out the ladies, who will soon learn to consider the floral department as their special province, and thus a double benefit will be gained.

Second—By encouraging the cultivation and planting of ornamental trees and shrubs, and of generally adorning the home; by paying some attention to the arts of landscape. gardening and rural architecture; by studying the habits of trees and shrubs, with a view to their future as well as present uses and effects.

Third—By impressing on members the duties they owe to themselves, the public, and the cause of Horticulture, of setting the example of a pure, simple and yet intelligent rural life—one that shall influence the rising generation to leave the city, and seek the country instead of, as at present, forsaking the labors of the farm, the orchard and the garden, for those of the shop, the manufactory, or the learned professions; by sustaining and supporting the efforts now being made in various directions for extending and facilitating the means for obtaining agricultural and horticultural education; in brief, by all means within their power to raise Horticulture to its proper place, as a profession at once progressive and elevating, and both by its precepts and practice calculated to advance alike the physical and moral interests of humanity. Much more could be said on this portion of our duties, but this paper has already exceeded the limits of a "brief essay," and, I fear, the patience of this Society. It is by this time apparent that what I have advanced as my idea of the mission and management of Horticultural Societies is confined mainly, if not entirely, to district societies, and does not apply to the State Society. Of the duties of this body, I will not attempt to enter into discussion. Members are present here much more able than myself to appreciate and comprehend their mission, and by their presence here show that they are ready and willing to attend to the details of its management. I will, however, allude to what I consider an important part of the duty of the State Society toward the local bodies. It is the collection of reports, statistics and horticultural facts from all of these local societies, and embodying them in the Annual Report, thus making a collection that would be, to a considerable extent, an Annual Horticultural History of the State, in addition to what we now have in our proceedings.

In conclusion, Mr. President, let me say that I am aware that the paper I have read is crude and unfinished, and presents little that is new, much that may be unnecessary, and, perhaps, some things that may be impracticable; but the Society can pick out the grain from the chaff, and if only one good or practicable idea can be eliminated therefrom, my attempt will not have been altogether in vain.

Moved and carried that the report be received and printed with the proceedings.

Prof. Swallow said at least one thing mentioned in the essay deserved immediate attention; that which related to ornamental trees, flowers, etc. He moved that a committee be appointed to prepare a list of ornamental trees, shrubs and flowers, to be reported to the Society at its next meeting.

Carried, and Prof. Swallow, Carew Sanders and D. M. Reichard appointed such committee.

The Apple List was again taken up.

Father Abraham—Added to to the list for winter.

Hay's Winter Wine—Added to the list for fall.

Lawver—Mr. Park spoke strongly in favor of it as a long keeper, and of very good quality and fine appearance. Added.

Winter Sweet Paradise—Added.

The committee on the course of studies for the State Agricultural College reported, through their chairman, Mr. Tice, that they could only report progress, and asked further time, so that they might visit the college.

Time was granted, and they were cordially invited to visit the college at any and all times, by Prof. Swallow.

Dr. Warder addressed the Society at some length on the best modes of agricultural or industrial education. He said he had for several years past given this subject a great share of his attention,

but would not now attempt to enter into a history of what might be termed the *new* system of education; but one of the great disadvantages we have to encounter in this work is the fact that it is a new thing, a new question, one for which the older systems have made no preparation, and in which we have no precedents to work by. Therefore he would go entirely away from the beaten track; away from the universities and seats of learning already established; and would get both ideas and teachers from the ranks of the people, and so form the courses of study to be pursued.

Messrs. Murtfeldt, Park and others made some remarks on the value of agricultural pursuits and agricultural education, and warmly indorsed the views of Dr. Warder.

The committee appointed to revise the list of peaches, presented the following report:

Your committee respectfully recommend the following varieties of peaches for cultivation:

Hale's Early,	Early Tillotson, (for family use,)	Newington Cling,
Troth's Early,	Old Mixon Free,	Heath Cling,
Large Early York,	George the IV,	Morris White.
Stump the World,	Jacques Rareripe,	

Respectfully submitted,

W. E. McBRIDE,
GEO. S. PARK,
L. G. MUNGER, } *Committee.*

The report was received, and the varieties taken up for adoption or rejection.

Hale's Early, Troth's Early, Large Early York, Stump the World, Old Mixon Free, George the IV, Jacques Rareripe, Early Tillotson, Heath Cling and Morris White were adopted.

Newington Cling and Early Crawford were rejected, and Smock Free was added to the list.

On motion, the rules were suspended, and the fixing of time and place of next meeting declared in order.

Mr. Wielandy, in a few well-chosen remarks, nominated Jefferson City as a proper place for the next meeting, and urged that it should be held at that point, and during the session of the Legislature, so the members of that body would have an opportunity of finding out from actual experience what the State Horticultural Society was doing, of which they were at present to a great extent ignorant.

The nomination was seconded by Prof. Swallow, and unanimously carried—the time for holding the meeting to be the time fixed in the Constitution, viz, the second Tuesday in January, 1873.

Mr. C. W. Murtfeldt offered the following resolution, which, after a few remarks, was adopted:

WHEREAS, This Society is now in a condition, and likely to be in the future, to pay a regular salary to the Secretary; therefore,

Resolved, That the salary of the Secretary of the Missouri State Horticultural Society is hereby fixed at the sum of two hundred dollars per annum.

GENERAL LIBRARY University of MICHIGAN

The following resolution was also adopted:

Resolved, That the Secretary is hereby instructed to procure a copy of the memorial presented to the Legislature by the committee appointed to procure an appropriation for the benefit of the State Horticultural Society, if the same can be found, and that said memorial be printed as a part of the proceedings of this Society.

Also the following:

Resolved, That Mr. Wielandy be appointed to represent to the Legislature the wishes of the Society, that an edition of the report of the State Board of Agriculture be published in the German language.

This resolution drew out strong arguments in its favor from several members—it being urged that the result of an edition of the report in the German language, as proposed, would undoubtedly be that a large number of the most desirable class of immigrants would be attracted to our State, from the statistics and accounts of our agricultural and Horticultural advantages, and progress contained therein.

Unanimously adopted.

The Committee on the Treasurer's Report presented the following:

MR. PRESIDENT: Your committee, to which was referred the Treasurer's recommendation to make a thorough investigation of the products of apple orchards, the diseases of fruits and trees, the partial or total failures of certain varieties in some localities, and the causes of such diseases and failures, beg leave to report as follows:

The Treasurer reports the unquestionable fact, that in the commercial metropolis of the State, the demand of the market for home consumption of winter apples is in excess of the supply from Missouri and the adjacent State of Illinois, and in order to satisfy the demand, the lake shores of Michigan, Ohio and New York are laid under contribution. Now, why is this? And we ask the question with the more seriousness when we look at the abundant and unequaled display of apples (both for size and quality) now before us on this Society's table for exhibition. This is convincing evidence to the committee that here, on the western border, in the valley of the Missouri, as fine specimens of apples can be raised as in any part of the globe, and the specimens we find as delicate and delicious as they are large and beautiful. Then the question occurs, can the apple be grown with profit? Facts seem to answer the question in the negative; for if there be a demand for winter apples, and it is not supplied, the inference is that it does not pay to raise them. But orcharding in Missouri is in its infancy; few, if any, have gone into it as a business; the fine fruit you see here is mostly produced by amateurs, for their own gratification, or for farmers who have planted orchards for obtaining a supply for family use. But the question, whether the cultivation of apples can be made a paying business, has scarcely been agitated. The ready sale that farmers have found for their surplus fruit for the past few years has directed more attention to apple culture. People now want information—

First—As to the extent of the demand at the different seasons of the year;

Second—As to the varieties in demand; and

Third—As to the productiveness, and, consequently, profitableness, of varieties that will fill the demand.

The question of locality, soil, and exposure, is also one of vital importance, upon which more accurate information is wanted.

Your committee, therefore, recommend that a committee of one from each Congressional District be appointed, whose duty it shall be to inspect the principal orchards in his district, examine into their age, condition, locality, soil, productiveness, varieties, diseases, etc., etc., and report to the chairman, to be embodied in the general report. Moreover, the committee recommend that, in addition to the duty imposed upon the chairman, he shall visit, in every district, such locality as the committee of that district shall deem of sufficient importance to require particular examination for the better understanding of the matter of investigation. Said committee shall only report such facts and details as have fallen under their own observation, or which shall have been elicited in the course of investigation. In reporting, either favorably or unfavorably, upon any variety,

they must have inspected such variety, while in fruit, in the orchard, and observed closely its habits and character.

Your committee believe that this course alone can insure information that can be relied on with confidence by the people of the State to guide them in apple tree planting.

Your committee also recommend that this Society pay the actual expenses incurred while in the performance of their duty, by each member, and a reasonable compensation for each day engaged in the work.

JOHN H. TICE, *Chairman of Committee.*

The report was received and accepted.

It was then moved that, as the objects aimed at in the report were also embodied in the resolution already adopted by the Society, we now preceed to elect the members of the committee, as provided by the resolution.

Agreed to, and a motion made and carried that the *actual* expenses of the committee, while pursuing their investigations, be paid out of the funds of the Society.

The Society then elected the following gentlemen as members of the committee:

First Congressional District			John H. Tice
Second	"	"	J. J. Squires
Third	"	"	—— Douthett
Fourth	"	"	D. S. Holman
Fifth	"	"	John F. Wielandy
Sixth	"	"	W. E. McBride
Seventh	"	"	James M. Storm
Eighth	"	"	Dr. J. N. Stewart
Ninth	"	"	G. C. Swallow

The following reports from the *ad interim* committee were received, and ordered published with the proceedings:

REPORT OF AD INTERIM COMMITTEE FOR THE SOUTHERN DISTRICT OF MISSOURI.

The southern half of the State, with some exceptions, has, in common with the other fruit-growing sections of the West, yielded an abundant crop of fruit. Apples, pears, grapes and other small fruits have rewarded the labor of the horticulturist by an ample return of fruits. Peaches have have done well also, in certain favorable locations, where good care and culture have been bestowed. But for the particulars concerning this crop, I refer the Society to the accompanying paper by J. Guy, Esq., of Jefferson county. For a more full report upon pears, I also refer to the subjoined report of Rev. Chas. Peabody, of Glenwood, Jefferson county, who, as a member of this committee, took charge of the pear division, and also the sub-report of F. F. Fine, Esq., of Springfield, on the south-west part of the district.

The apple crop was better than any other of the tree fruits, by reason of its having in a great measure escaped injury from the late frosts of spring. Where the soils are fertile, and especially where no other crops are taken from orchard lands, the apple crop has been large, and of good quality. The depredations of insects have been less than usual upon this fruit, and hence it has been uncommonly fair; but owing to low prices for all fruits, and the tendency to decay shown in even the late winter varieties, as well as in those of earlier maturity, this crop has been less profitable than in seasons when only moderate crops are produced. The liability to decay has been remarkable in the apple this season. This condition is probably owing to the over-ripeness of the fruit, caused by the heat and dryness of the summer, and the absence of the usual fall rains.

The drouth of this year has been of long continuance — commencing with the first growth of vegetation in the spring, and continuing to the close of the year. This dryness, covering, as it did, the whole period of growth, was very disadvantageous to the propagation of nursery stock, and to the making of new plantations of either fruit trees or vines.

THE GRAPE.

This crop had never a better promise than last spring. The buds of even our half-tender varieties had wintered well, and up to the —th of April everything favored an extraordinary crop. At this time, our State was visited by a killing frost, which did essential damage to the vineyards and orchards which were situated on low grounds. In low vineyards the primary shoots, which were from two or three inches to nearly a foot in length, were generally destroyed on all varieties. This experience has served to enforce upon the minds of the people the rule, so generally acknowledged, yet so often disregarded, that it is always unsafe to plant orchards, and still more so vineyards, in valleys, or other locations that are relatively low. Vineyards on high grounds wholly escaped the late frosts of last spring, and in such locations the high promise of the spring was fully realized in the matured crop. The per cent. of saccharine matter developed in this fruit by the warm and dry season has been considerably above the average. The Concord has this year shown as high as 96° of Oechsle's scale, while other varieties have been correspondingly rich in sugar. The yield has also been generally large — some small vineyards in our district having, by actual weight, yielded ten, twelve, and in one instance, as many as eighteen thousand pounds of well-ripened fruit to the acre. This enormous production, joined with the high per cent. of sugar contained in the crop, demonstrates the adaptability of the soils and climate of our State to the growth of this fruit, in the highest degree of its excellence.

OF VARIETIES,

The committee have but little to say, except that the Concord continues to be the leading variety, being planted more largely than all other varieties combined, and to express increased confidence in the ultimate success of the Martha.

The committee visited a large number of orchards and vineyards — upward of thirty of the latter in Jefferson county alone — although their labors covered but a small part of the territory comprised in the Southern District. A good many vineyards in St. Louis county, and also a large number of vineyards and orchards in the south-west part of the State, were also visited by members of the committee. Their work, though far from being complete, has been too extensive to attempt the giving of a detailed account of individual places.

Various modes of training the vine were met with, both on stakes and on trellises. No example was seen, however, where the special system of training to stakes had been practiced, except on a few vines. The observations of the committee lead them to the conclusion that the trellis, as a means of support, has so far shown much better results than the stake system, as ordinarily practiced. In some instances the

CULTURE OF THE VINE

Has been excellent; while in many others, and especially in the southern part of Jefferson county, it was this season by no means as thorough as, in the opinion of the committee, would be found profitable to the proprietors. Neglect of that thorough culture, so necessary to the vine, has been quite too common, and the committee noticed, among others, a lack of the clean culture usual in the vineyards of the Cliff Cave Wine Company; but they have the promise of the manager of these vineyards that it shall not be so in the future.

Statistics of the number of acres in vineyard in the county of Jefferson have been collected with considerable care. The result shows a total, in this county, of 647 acres collected by actual examination—the names of owners being all given, with the number of acres each has. St. Louis county is estimated to have about the same quantity. This information may prove valuable, as it will serve as a basis of calculation for determining approximately the whole number of acres of vineyards in the State.

When we consider the number of acres contained in the two counties named above, most of which is already in full bearing, we can readily understand why the St. Louis market becomes over-stocked with this fruit, and low prices inevitably follow.

In closing this brief report, the committee would congratulate the grape-growers of the district upon the rapid strides in grape-culture which, within a very few years, have been made in this section of the State; and also express their confidence in the still greater development of this particular interest, which will take place in the future.

C. W. SPALDING, *Chairman.*

SPRINGFIELD, Mo., December 19, 1871.

DR. C. W. SPALDING, *Chairman:*

DEAR SIR—I have neglected the writing out of any notes of observation on orchards and vineyards until I fear it is too late. As one of the *Ad Interim* Committee, I have visited several orchards, apple and peach; also, vineyards in Greene, Dade and Jasper counties. Apples—About three-sevenths of a crop; generally perfect, but small on account of over-bearing and drouth. Some orchards were a complete failure — especially on the low grounds — caused by late frosts in April last; many trees were killed by the hard winter of last season, especially in young orchards. No insects of consequence, either on foliage or fruit, the past season. I find most all the leading Western varieties fruiting here, and generally doing well. The finest orchards here are planted or growing on what it is termed here cold lands: that is, unproductive for general farm crops, but which give the finest apples, especially for Newtown Pippins. Peaches—In the three counties mentioned, the cold of last winter just left the trees alive, with a few exceptions, where they bore a partial crop of fruit. Grapes — Scarcely any fruit to be seen, on account of the vines being killed outright, down to the ground — the fall having been so moist that the vines did not mature sufficient to meet so severe a freeze; and three-sevenths of what fruit did set on the vines, and escape the freeze, rotted during June and July, (which were very showery,) except the Norton and the first fruiting of the Martha, which did not rot. Vineyards made fine growth, and foliage generally healthy, except Delaware and some of the Rogers, which shed their foliage too soon.

Insects—The gall-flies were numerous last season, but I found only one vine (Delaware) infested with it this season. Late in the season, the Leaf-folder attacked the foliage the worst I ever saw — first the Norton, and those that were on the ground; no Leaf-hoppers to be seen as far as my observation went. A few small vineyards here, on high, dry, poor land, which I did not visit, had a good crop of sound fruit—(Concord; I saw the fruit in market.)

Pears badly affected with blight, and scarcely any fruit on account of late frost in April.

I believe this is about all the observations I have been able to make this season, and think that Dr. L. D. Morse can give a more accurate account of the vineyards and orchards, as he has traveled over a large portion of this district.

All of which is respectfully submitted.

Yours, etc., F. F. FINE.

Also, the report of the Committee on the President's Address, as follows:

The Committee on the President's Address have had the same under consideration, and beg leave to report:

First—That this Society will perform a very acceptable service to the fruit-growers of the State by giving them reliable information of what varieties to plant in the different sections of the State—varieties that are known to succeed in such sections by actual experiment, and that such varieties are such as, by their productiveness, will be profitable, and, by their time of ripening and quality, will meet the demands of the markets at the different seasons. The committee, therefore, instead of recommending a thorough revision of the fruit lists, as indicated in the President's Address, would recommend that, if deemed advisable by the Society, a special committee be appointed to recommend a provisional list until a full and permanent list can be adopted, after full investigation of the subject in all parts of the State. In order to make a thorough, full and careful investigation of the adaptability of the various varieties of apples, peaches, pears, plums and cherries to the soil and climate of the different localities of the State, that a committee of one from each Congressional District shall be appointed, who shall make diligent investigation in their respective districts, and report through the chairman at the next meeting.

The committee most earnestly commends the suggestion made in the President's Address to the consideration of this Society, and we recommend that a special committee be appointed to collect the new varieties of fruits, and present them at the next meeting, giving history, value and qualities, including grapes and small fruits, that this Society may have data to recommend from.

The President's advice with regard to preserving timber, and planting timber belts, is especially recommended to the Society and to the country.

We most earnestly recommend to our Horticultural friends the cultivation of rural tastes, and the love of horticulture, among our sons and daughters, and, as our President suggests, cultivate at home the highest and purest social refinements. The present is fraught with dangers; let no parent slumber until he looks after his sons and daughters, and inaugurates a new era. We hope

Prof. Swallow will give us a new book on this interesting subject, but all must work together, and our youth be made to feel that rural art is the highest and noblest among men.

JOHN H. TICE,
GEO. S. PARK,
U. P. BENNETT,
} *Committee.*

The committee to revise the Vegetable List presented a report, which was received, and made the special order for discussion at the evening session.

S. R. Kelsey, of Pomona, Kansas, addressed the Society, and invited the members to meet with the Kansas State Society, at their next annual meeting, to be held at Topeka, on the second Tuesday in December next.

Mr. Kelsey said the show of fruit in the hall was correctly named, and as fine as any he ever saw, but warned growers that unless great care was taken it would not always be so; and especially must we guard against our insect enemies, which were yearly becoming more numerous.

Mr. Kelsey closed by again inviting all interested in horticulture to come to Topeka, and the Kansas people would try to come to Jefferson City.

Dr. J. Stayman, of Leavenworth, and S. R. Kelsey were then elected honorary members of the Society, which then adjourned until 7 o'clock P. M.

Evening Session.

Meeting called to order by President Vories, at 7 P. M.

The following letter was read by the Secretary:

HANNIBAL, MO., January 9, 1872.

MR. H. M. VORIES, *President State Horticultural Society:*

The North-east Missouri Horticultural Society, at this place, cordially invite the State Horticultural Society to hold its next annual meeting with them, and have so instructed her delegates to vote for it to be held at Hannibal in January, 1873.

(Signed) D. JENKINS, *President.*
MARC W. WOOD, *Secretary.*

P. S.—Come, gentlemen; we will give you a hearty welcome and hospitable entertainment.

JENKINS AND WOOD,
(In behalf of the Society.)

It was received and ordered puhlished, with the thanks of the Society for the invitation extended, although received too late for consideration, the place of next meeting being already fixed.

The following report from D. S. Holman, Vice-President, from the Fourth District, was then read:

Mr. President and Members of the State Horticultural Society:

In our report for the year just ending, we are sorry to complain that the seasons have been unpropitious, and that the horticultural crop, in almost every variety, was much shortened. The very unusual warm and protracted autumn pushed the fruit-buds to an undue development, which caused them to yield more readily to the frosts of winter, which were unusually severe for this district, injuring even the wood of some fruit trees and vines to the snow-line.

Of the Apple, the average yield over the district was less than half the usual crop. Some varieties gave most magnificent specimens, suggesting the propriety of *thinning* when over-bearing occurs, to increase size and quality of fruit and relieve the over-laden tree. Apples sold in Springfield, from October 10th to November 10th, at twenty-five cents per bushel, mixed keeping varieties, delivered. The same varieties, December 26, were $1.

Peaches were almost a failure again, but an occasional wagon load came from the more sheltered orchards in the timbered portions of Dade, Christian, Polk and other counties, and were sold at $2 per bushel—all Seedlings.

Pears, Plums and Cherries gave so short a crop they did not get from home to be seen in market often.

The Grape crop, from the same cause, was a failure, measurably; but where there was an escape, by protection or accidental covering in snow, the clusters were very fine, and the different varieties ripened well.

Strawberrries did not suffer from the severe frosts that did most injury to other fruits named above. They were under a heavy covering of snow at the time. The yield was not large, but we never saw finer berries than were exhibited in the Springfield market, and, more particularly, upon the tables of the Greene County Horticultural Society, where about a dozen varieties were shown—the Wilson and the Russell measuring four to five inches in circumference. The Wilson's Albany, with us, is to all other strawberries as the Concord with other grapes, and Bartlett among pears.

Two successive failures in the fruit crop would argue discouragement in planting, but I am most happy to report progress—even crippled, as we are, in horticulture as in all other business, by financial stringency; there is more effort to plant orchards and vineyards, more demand for trees, vines and plants than formerly. Frequent examinations of soil, situation, altitude, etc., of this region, together with the more convincing actual experiments, demonstrate the adaptation of the Fourth Congressional District, and its immediate surroundings, to successful, profitable fruit-growing. This fact, with increasing facilities to market fruit, is influencing the progress we here report. Before the trees now being planted ripen their fruit, railroads will cross at right-angles upon the Ozark Mountain, penetrating the far West and South, bringing the distant markets home to the very orchards.

The autumn of 1871 was very favorable to a thorough ripening of wood and proper maturing of fruit buds, followed by a winter of moderate, steady cold weather to the close of December, the mercury sinking but once below zero, and then (December 4) but two degrees below.

At present we have hope for an abundant crop of all fruits grown in the district, in 1872. Hoping thus, we also hope you may receive a more interesting report at your next annual meeting, from the Ozark Mountains.

Very Respectfully,

D. S. HOLMAN.

SPRINGFIELD, Mo., January 8, 1872.

The report was received and ordered printed with the proceedings.

The report of S. F. Taft, from the *Ad Interim* Committee, was next read.

To the Chairman of the Ad Interim Committee:

SIR:—I send you a few items from Marion and Ralls counties, to add to or assist in making up your report.

GRAPES.

We had a late frost last spring, which killed the young shoots and the already formed blossoms upon the grape vines. The young shoots were badly injured in this locality; mine looked as if fire had run through them. Having read a statement from some of the members of the Grape Growers'

Association that when the young grape sets are killed by frost they will not bear a crop that year, and having tried an experiment in 1860 with vines in a similar condition, with good results, I concluded to repeat it now; so, shears in hand, I set to work, removing the young shoots within from one-fourth to one-half an inch of the old wood; and where a large quantity of old wood had been left, I removed a portion of it. The result was, the dormant eyes put forth and I had a fine crop of grapes. I visited others and advised them to give this treatment a trial, and their success was measured by the thoroughness of the work.

APPLES.

I have visited several orchards this season, and found the root louse at work quite extensively on the apple root. Its presence is indicated by a yellow, sickly looking tree and shriveled fruit. I saw no specimens of the true bark louse; do not think they will thrive here. The aphides (or ant cow) does a great deal of injury to young trees. Scattering fresh ashes upon the leaves in the evening I find to be the most effectual remedy. The codling moth and apple worm are doing an immense amount of damage, causing a heavy annual loss to our orchardists. I do not think I am estimating too high when I say that not more than one specimen out of five was free from these insects, and not more than one in eight were perfect specimens, being free from punctures by the gouger, curculio and other insects; and unless we can have some concentrated action among fruit growers in destroying these pests, this "home of the apple," this great fruit growing locality, will be compelled, in a few years, to import fruit for their own use, instead of, as now, exporting thousands of barrels annually.

PEACHES.

Peaches were a short crop this year—some orchards bearing, others without a specimen. I will mention the condition of one orchard; it may give a subject for discussion, and elicit some facts of value. The orchard has about 300 peach trees, upon elevated timber land, with no wind-break upon the north, east or south sides. Upon the west is a heavy piece of timber; this runs diamonding into the center of the orchard, about eight rows of trees, thus giving shade from the south-west sun to some trees, and shelter from the north-west wind to others. Those trees in the north-west corner, and on the east of a south-east line with the point of timber, bore the best; while in the south-west corner hardly a specimen of fruit could be found; but they increased as you left the woods and went eastward. The borer is the worst enemy the peach tree has here.

You will please remember me to the Society. State that it is impossible for me to be with them bodily, but my heart and mind are both with you. S. F. TAFT.

The report was ordered to take the usual course.

The following resolution was unanimously adopted:

Resolved, That the thanks of this Society are hereby tendered to Messrs. Goodman & Jarrett, Florists of Kansas City, for the collection of flowers and plants exhibited by them, and forming an attractive feature in this hall.

And also the following:

Resolved, That the thanks of this Society are due, and are hereby tendered, to the citizens of Kansas City, who have extended their hospitality to members of this Society; to the Sheridan Hotel for reduced rates; to the city authorities for the use of this hall; and to the city papers which have noticed the meetings of this Society and published its proceedings.

Carried unanimously.

The Vegetable List was then taken up, and the following varieties adopted:

Asparagus—Conover's Colossal.
Beans—Early Valentine, Dwarf Wax, German Wax, Lima.
Beets—Early Bassano, Blood Turnip, Long Blood Red.
Brocoli—Purple Cape.
Cabbage—Large Early York, Winningstadt, Early Wakefield, Premium Flat Dutch, Drumhead and Drumhead Savoy.
Cauliflower—Early Erfurth.
Egg Plant—Improved New York Purple.
Carrots—Early French Short Horn, Long Orange.
Parsnips—Hollow Crown, Sugar.
Cucumbers—Early Frame, White Spine, Long Green.

Radishes—Red Turnip, Long Scarlet Short-top, Salmon, and White Olive Shaped for early, and Black Spanish and Chinese Rose for winter.

Lettuce—Curled Silesian, Early Cabbage, Early Egg, Winter Head.

Squash—Early Bush Scallop, Summer Crookneck, Hubbard, Kershaw.

Onions—Wethersfield Red, Yellow Danvers, Silver-skinned—for sets, buttons or top onions.

Salsify—Or Oyster Plant.

Turnips—Strap Leaved Red Top, Sweet German.

Sweet Corn—Darling's Extra Early, Crosby's Early, Stowell's Evergreen.

Potatoes—Early Rose, Peach-blow, and Peerless and Excelsior for further trial.

Sweet Potatoes—Yellow Nansemond, White Brazilian.

Rhubarb—Linnæus.

Water Melons—Mountain Sweet, Black Spanish, Ice Cream, Orange, and Joe Johnston for trial.

Musk Melons—Skillman's Fine Netted, Long Persian.

Spinach—Sumner or Round.

Tomatoes—Trophy, Tilden, General Grant, Early Smooth Red.

Peas—Carter's First Crop (for trial), Landreth's Extra Early, McLean's Little Gem, Knight's Dwarf Marrow, Champion of England, Eugenie.

Okra—Long Green.

Pepper—Large Bell, Long Red.

Celery—Turner's Incomparable Dwarf White.

J. P. REICHARD,
J. STAYMAN,
A. J. STEWART,
} *Committee.*

It was moved and carried that we have a standing Committee on Vegetables.

D. L. Hall, Jacob P. Reichard, J. F. Wielandy, J. J. Squires and Prof. Swallow were appointed such committee.

The following resolution was adopted:

Resolved, That the Secretary be authorized to publish a circular containing a list of all committees of this Society, their postoffice address, and the nature of their duties, and mail a copy thereof to each officer and member of committees.

The Cherry List was then taken up for revision, with the following result:

Adopted for general cultivation:

Black Tartarian, White Tartarian, May Duke, Early Richmond, Governor Wood, English Morello, Belle de Choisy, Yellow Spanish, American Heart, Belle Magnifique, Reine Hortense.

The Plum List was next taken up, and the following varieties recommended:

Jefferson, Smith's Orleans, German Prune, Lawrence Favorite, Washington, Columbia, Lombard, Damson, Chickasaw, Coe's Golden Drop, and Imperial Gage.

The following list of pears was adopted:

Summer Varieties—Doyenne d'Ete, Tyson, Bartlett, Osband's Summer, and Clapp's Favorite, for trial.

Fall Varieties—Beurre d'Anjou, Flemish Beauty, Louise Bonne de Jersey, Seckel, White Doyenne, Buffam, Duchesse d'Augouleme, (on quince only,) Beurre Bosc, and Beurre Diel.

Winter Varieties—Glout Morceau, Winter Nelis, Lawrence, Vicar of Winkfield, Easter Beurre, and Mount Vernon, for trial.

As usual, the subject of pears brought up the blight question. After some desultory remarks from several members.

Dr. Stayman said, the pear-growers of Leavenworth county, Kansas, succeeded in growing pears successfully for ten years, but now all their orchards are completely destroyed by the blight. They universally go at twelve years old or younger; we have no pear trees in Leavenworth county to-day over that age, except in one or two isolated cases. We have had the blight every year since 1865, usually from May 10th to June 10th. The increase of the annual rain-fall since 1865 is eleven inches, which mostly occurs between May 10th and July 10th; put these facts together and draw your conclusions. The only pear trees that are doing any good are on poor, shaly soil, and on the same soils, Catawba, Iona and Diana grapes are also succeeding. I consider pear culture in this section a failure. I do not believe blight to be contagious but cutting it off will not stop it, or cure it.

Mr. McBride gave some experience going to show that blight was contagious, as did several other members.

Mr. Reichard believes that the primary cause of blight is too rapid evaporation in winter.

Mr. Swallow—It seems to be taken for granted that the pear blight, and that which attacks the apple, are the same thing. I do not think so.

Mr. Vories—The blight which occurs on the crab-apple is identical with the pear blight; that occurring on the apple tree is very different.

The President then announced the

COMMITTEES FOR 1872.

On Business—Jno. F. Wielandy, F. A. Nitchy, C. W. Murtfeldt, J. A. Blair, G. C. Swallow.

Entomology—C. V. Riley, G. C. Swallow, J. H. Tice.

Flowers—D. M. Reichard, Chas. Peabody, W. E. Sheffield, Carew Sanders, Marc M. Wood.

Vineyards—C. W. Spalding, G. S. Horning, Jacob Madinger, G. M. Dewey, Samuel Miller.

Orchards—Z. S. Ragan, J. C. Evans, Wm. Stark, Geo. S. Park, L. G. Munger.

Vegetables—D. L. Hall, Jacob Reichard, J. F. Wielandy, J. J. Squires, G. C. Swallow.

Ad Interim, North District—A. E. Trabue, G. M. Dewey, L. G. Munger, Chas. H. Mansur, J. T. Zimmerman, —— Humphreys.

South District—R. J. Lewis, C. W. Spalding, Chas. Peabody, H. Clagett, U. P. Bennett.

Some few unimportant items of unfinished business were attended to, and a resolution adopted as follows:

Resolved, That the Secretary be requested to use all measures in his power, by proper representations to the different railroad companies, to procure passes for the officers and members of committees of this Society, to be used by them only when traveling on the business of the Society.

The Society then adjourned.

DANIEL L. HALL, *Secretary*.

The following letters and reports have been received since the meeting:

MARSHFIELD, WEBSTER COUNTY, Mo., January 6, 1872.

MR. F. F. FINE:

DEAR SIR: I have no means at my command by which I can give you a very correct report of the fruit interest of our county. When you made the request, our County Assessor, Mr. Winningham, had gone over about two-thirds of the county; notwithstanding, he then took in the other portion, about 25,000 apple trees in orchards, and very generously offers to take a full account of such things next year, if desired.

From the best evidence at command, there are about 75,000 or 80,000 apple trees in orchard form, about 25,000 grape vines, besides a general assortment of almost all fruits, and many of the finest flowers adapted to this climate, mostly set within the last four years.

Having been only three years in the county, I, with many others, am just beginning in the fruit business. I have 500 apple trees, four years from graft; had a few apples last season. I pay boys to hunt the borers in September. They took out about 100 this fall—as high as seven from one tree; worms about three months old. Have not lost a tree by the borers, while I am continually called on for young trees to re-plant my neighbors' orchards killed by them.

I have about 250 pear trees—dwarfs and standards alternated—perfectly healthy and thrifty.

Orchards are sometimes affected here by sun-scald on the south-west side, especially if they are trained tall, or a long stem below the limbs. Most of the orchard trees here, having been set perpendicular, are now standing, immovably fixed, at an angle of about 10° north-east, exposing the stem and surface roots to the sun, not only in summer, but in warm days in winter, thawing the sap, from day to day, on the sun side, when it is frozen in all other parts of the tree. This trouble is being counteracted in most of the young orchards, and even the sweet cherries have, on our north hillsides, proved themselves worthy of further trial, by producing as fine fruit as the world ever saw of the same varieties.

We plant our orchards of as low-headed, stocky trees, as would be practicable to allow the free range of hogs after they come into bearing, and always place the heaviest limbs south-west, and incline the tree in that direction; then, by occasionally pinching the terminal buds on the opposite side, we may secure enough growth on the south-west side to protect the tree in spite of the incessant gales that blow, and blast, and bend the young shoots that start on that side.

The season has been one peculiarly hard on the farmer and gardener. The drouth, which continued through July, August and September, cut short the corn crop three-fourths, delaying long and preventing entirely the sowing of an average area of wheat, destroying the entire crop of cabbage, and the main crop of turnips, and paralyzing every effort to grow any vegetables, profitably, during the above months; notwithstanding, every industrious family has a supply.

There was, perhaps, three-fourths of an average area of wheat sown—mostly in October—which now looks badly, but so far, plants enough on the ground, notwithstanding the very dry, cold weather through November and December.

The rain set in about the first week in October, after which our late potatoes nearly doubled their crop, after those of our sister prairie counties were killed by frost.

Up to the 18th of October our dahlias were a perfect profusion of blooms.

Webster county is situated in latitude 37½° North, and longitude about 15½° West, from Washington, embracing the highest points on the Ozark range. Our county contains about five hundred thousand acres of the most varied, but perhaps four-fifth tillable land.

We are just beginning to realize, on a small scale, what Prof. Swallow said in general of this and other counties, on the Ozark range: "that we possess, in a peculiar combination, *more* of the essential elements for fruit growing than any other part of the State." We are continually surprised and delighted at the superior quality and fine size of specimens of fruit, of almost every variety, grown in our mountain orchards. Many varieties, that we considered uncertain in the prairie counties, produce here good crops, and of fine size. Some men here speak in the highest terms of the Northern Spy, Esopus, Spitzenberg, Roxbury Russet and R. I. Greening, giving flattering reports from a few trees. We have seen better yield and finer specimens of N. T. Pippin and Yellow Belleflower, Fall Pippin and Large Romanite, in Webster and Wright counties, than we ever saw anywhere else; while the leading varieties certainly do as well.

Most of our orchards and vineyards were damaged by the late frost on the 11th of May, which entirely destroyed the fruit and wheat in many sections of less elevation; even 100 miles south of us. Notwithstanding this frost seemed to kill almost all the first blooms, our grapes put out secondary bloom, and all vines old enough produced a paying crop—in many cases large. I

counted 133 bunches on one of my Concords, three years from cutting, last spring. I had 700 vines, very irregular in size; averaged about five pounds each—same age—on sandy loam, north-west slope.

Mr. W. F. Greely put up 200 gallons, pure Concord juice, from 700 vines, four years old. Mr. John Bolinger about the same. Others, having small vineyards near here, sold the grapes here at from five to ten cents per pound. Though about fifteen different kinds have been fruited here in sample rows, the crop above was Concord.

Our small market here opened with apples; White Jeniton, Early Harvest, Red June, etc., at $1 per bushel. The main crop of apples has been dull at from forty to fifty cents per bushel, for which can be bought now the finest Ben Davis, Jeniton, Winesap, Limbertwig, Little Romanite, etc.; also the Ingram and Roberson Pippin, originated in Greene county.

Pears and peaches sold at $1 per bushel—the peach crop being all killed by the late frost, except on the most elevated or northern hillsides.

There was a full crop of the Morello family of cherries. Some fine fruit on the Governor Wood, Elton, Yellow Spanish, Early Sapington and May Duke. Early May cherries sold at from 50 cents to $1 per gallon.

Marshfield is situated on an elevated plain, 1100 feet above St. Louis, surrounded by thousands of acres of rolling hillsides, fertile plains and abrupt bluffs, facing every point of the compass—peculiarly adapted to fruit growing—at from $1.25 to $10 per acre.

From twenty-five years' experience in tree-planting, in Greene and Webster counties, I can confidently recommend especially the northern slopes in Webster county, to any one wanting to embark in the fruit business West, as we are almost on the border of an unbounded region, that never can grow their own supply, extending from the Upper Missouri River to the Gulf of Mexico.

Yours, respectfully,

B. F. LEE.

Chairman of the Orchard Committee:

APPLES.

We had a more than average crop of both summer and winter apples, but owing to the late fall the latter were too ripe when cold weather really set in, and in consequence a more than usual quantity rotted. In my own case one-half were lost in this way, and I supposed for the reason assigned, though other reasons are given by some. The apple orchards in this section are increasing with healthy rapidity, both in quality and quantity; scarcely any one here thinks of setting out or planting a seedling for its fruit.

PEACHES

Were a comparative failure in quantity, but in quality were fully up to the average. It was found in one prominent instance, that trees, fully exposed to the north and north-west, bore ample crops, while in the same orchard, other trees, sheltered in that direction but exposed to the south-west, made a complete failure—ground in other respects alike—so that many here now contend that shelter is a disadvantage, and that peach orchards should be fully exposed, whether on elevations or on a level, to the severest weather that comes. This successful orchard was protected by timber on the south-west.

PEARS.

Pear culture is slowly increasing. We lost fully one-half our trees by the blight the first year—thirty trees. These were well cultivated, on rich soil; other trees, on rich soil, but not cultivated at all, were not attacked, and now are bearing. Westfall and others, with orchards on high, white oak ridges, do well. One who planted 400 trees lost only three—planted in spring of 1860—has 350 odd now.

PLUMS.

Plums here are not much affected with the black knot—I do not know of a single specimen—but the curculio is severe enough on the fruit to compensate; it is found they are much scarcer where frequently disturbed, as near a public road, or near the house where there is frequent passing. We have such an abundance of wild plums that I do not know of any one who has faithfully jarred the tame varieties. The Chickasaw plum seems almost invincible, and is the only really good one we know of that is.

CHERRIES.

Tame sweet cherries, on poor white oak lands here, are a success; on our rich and warm black soils are a complete failure. The bark bursts, and the cultivator scarcely gets more than one crop before the tree dies.

Very truly,

A. E. TRABUE.

CONSTITUTION AND BY-LAWS

OF THE

MISSOURI STATE HORTICULTURAL SOCIETY.

CONSTITUTION.

1. This Association shall be known by the name of the Missouri State Horticultural Society.

2. Its officers shall consist of a President, one Vice-President from each Congressional District in Missouri, a Secretary and Treasurer. There shall also be a Standing Committee of not less than three persons each, on the following subjects, viz: Business, Entomology, Flowers, Vineyards and Orchards. Special committees may also be appointed by order of the Society.

3. All officers shall be elected by ballot.

4. The duties of the President shall be to preside and keep order at all meetings of the Society, countersign all checks or drafts drawn by the Secretary on the Treasurer, and appoint all committees.

5. The duty of the Vice-Presidents shall be to preside at meetings in the absence of the President, in the order of the numbers of the several Congressional Districts, and report in writing to each annual meeting concerning the condition of Horticulture within their districts.

6. The duties of the Secretary shall be to keep a record of all the proceedings of the meetings, record the names of members of the Society, draw orders on the Treasurer for payment of all debts of the Society, and, when ordered, prepare the transactions of the Society for the press, and, also, to conduct all correspondence in behalf of the Society.

7. The Treasurer shall record all names of members of the Society, collect all the dues, and disburse the same upon orders drawn by the Secretary and countersigned by the President.

8. It shall be the duty of the Standing Committee on Business to prepare matter for discussion, and other business for action of the Society at its meetings, and bring the same before them in a proper manner.

9. It shall be the duty of the other Standing Committees to make examination, during the year, of the special subjects for which each committee is respectively appointed, and report their labors at the next annual meeting.

10. Any person may become a member of this Association by paying one dollar, annually, or a member for life by the payment, at one time, of ten dollars.

11. Honorary members may be elected by ballot vote, and all such members shall be entitled to all the privileges of the Society.

12. Annual meetings of the Society shall be held at St. Louis on the second Tuesday in January, of each year, unless otherwise ordered by the Society.

13. Special meetings may be called by the President and Secretary whenever they deem that the interests of the Society will be thereby advanced.

14. All officers and members of committees shall hold their office one year, or until their successors are chosen.

15. All vacancies that may occur during the interim of the annual meetings shall be filled by the President and Secretary.

16. By-laws may be enacted by the Society at any of its annual meetings.

17. This Constitution may be amended, at any annual meeting, upon a two-thirds majority vote of the members present.

BY-LAWS.

1. The expenses of the Society shall be paid out of the treasury; but in case of a deficiency in the treasury, such deficit shall be made up by a *pro rata* assessment on the members of the Society.

2. The annual fee of membership shall be promptly paid at the regular January meeting of the Society.

3. The Treasurer shall make a report showing the financial condition of the Society at each annual meeting.

4. The annual election of officers shall be the special order at the opening of the afternoon session of the second day of the meeting.

5. Six votes at least shall be given in favor of any fruit to place it on the list indorsed by the Society.

REPORT

OF THE

KANSAS CITY EXPOSITION

OF 1871.

REPORT.

On the 25th of July, 1871, an informal meeting of a few citizens was held at the office of Col. Coates, President of the Missouri River, Fort Scott and Gulf Railroad, and the Exposition decided on. A call was then signed by Messrs. K. Coates, Theo. S. Case, Edward Fleischer, F. Foster, M. English, E. M. McGee, E. H. Allen, Thos. H. Mastin, H. P. White, Ed. Haren, Jr., J. W. Reid, C. J. White and John S. Harris, and published in the city papers, calling attention to the importance of the movement, and urging the co-operation of all the citizens.

At the next meeting, the following officers were elected:

KERSEY COATES.....*President*.....
JOHN W. REID.....*Vice-President*.....
THEO. S. CASE.....*Cor. Sec'y and Chairman Executive Com*...
E. H. ALLEN.....*Recording Secretary*.....
THOS. H. MASTIN.....*Treasurer*.....
EDWARD FLEISCHER.....*General Superintendent*.....

By direction of the Board, the chairman of Executive Committee issued an address to the public, as follows:

TO THE BUSINESS MEN OF KANSAS CITY.

GENTLEMEN: It has been determined by the officers and managers of the Industrial Exposition Association to hold a fair, or exposition, in this city, during the coming fall, probably about the middle of October. Correspondence has been had with several leading manufacturers at a distance, as well as with several of our own city, and all declare an intention to be present and exhibit their manufactures. Enough has been learned from them, and the stock-raisers and producers of the country, to satisfy us that so far as they are concerned, the exposition will be a success, provided we furnish the proper and necessary facilities for such an exhibition.

In order to do this, we must erect buildings suitable for running machinery, displaying agricultural implements, farm products, textile fabrics and fine arts, and stables and sheds for fine stock, poultry, etc. We shall have to inclose a large piece of ground, build an amphitheater, set up steam engines to run the machinery, do an immense amount of advertising, etc., etc.

By doing all these things in good style, we can attract a large crowd to our city from all parts of this State and Kansas, which, aside from the immediate benefits felt by all classes of our community, will give us an opportunity not often enjoyed to increase and extend our commercial and friendly relations in all directions.

Expositions of this character are, of late years, being held in all the prominent cities of the country, and are justly regarded as a means of increasing trade and commerce, unsurpassed by any other. To do this properly will require a considerable expenditure of money in advance, and

as all classes will be benefited, we call upon all classes to assist us liberally. No business man can fail to see the importance of the success of this scheme, and no one can consistently refuse to aid it.

To let it fail now, will be a lasting disgrace to our city and to ourselves, especially when so little is asked and required, in order to put it on a sure footing. We do not ask for donations or gratuitous subscriptions. We propose to give to every subscriber the full value of his subscription in admission tickets, which he can sell, send out to his customers and friends, or dispose of in any way he pleases. There is no doubt whatever that every man will receive back, directly or indirectly, every cent he pays in. We beg of our fellow-citizens not to be backward in this matter. It is growing late, and whatever we do must be done this week. If you are not called upon by any of the Executive Committee, or its agents, call upon them and subscribe what you think it will pay you.

Our intention is to place this association upon a permanent footing, and make it, within two or three years, what it is in St. Louis—the pride and boast of the city.

THEO. S. CASE, *Chairman Executive Committee.*

Mass-meetings were held from time to time, and the citizens subscribed the amount of $10,000 as a guarantee that the premiums would be paid in the event of bad weather, or other cause of failure. To this the city added the sum of $2,000, and special premiums were offered by private citizens to the amount of about $5,000.

The third week in October having been fixed upon for holding the fair, an immense amount of work devolved upon the Executive Committee and Superintendent. Forty acres of beautiful ground, just within the city limits, were rented, a half-mile track put in order, buildings, fences, cattle and hog-pens erected, and by the first day of the fair-week, everything was in readiness.

The buildings were designed, and their construction superintended, by J. L. Parkinson, Esq.; the amphitheater by Messrs. Bryan & Myers; the contractor for the whole, Mr. W. B. Everhard. The total cost to the Association, of buildings, premiums, management, etc., was a little over $34,000.

About the 1st of September, the following circular was issued by the Superintendent and sent to all the prominent manufacturers, stock-raisers, editors and citizens of the country:

KANSAS CITY INDUSTRIAL EXPOSITION.

The managers of the Kansas City Industrial Exposition announce that an exhibition of manufactures, products and arts will be held in Kansas City, Missouri, opening on the 15th of October, 1871, and continuing one week.

Manufacturers, mechanics, artists, inventors and producers, in every section of the Union, are cordially invited to attend the Exposition and contribute thereto specimens of their inventions, skill and ingenuity.

It is the wish and purpose of the managers to make this Exposition the most thorough, complete, successful and pleasant exhibition ever yet held in the far West, and they desire the hearty co-operation of all who feel an interest in such matters, and in the development of this inexhaustible country.

Nowhere on this continent is there a greater field for profitable exhibitions of manufactures than here. Surrounded, as we are, by a vast region of country whose agricultural products are unsurpassable, whose mineral resources are unbounded, and enjoying every advantage for the appliance, in its development, of the finest skill and the most perfect ingenuity of the nineteenth century, located at a point whose natural advantages bring to its doors of commerce the trade of Kansas—the Garden State of the Union—the territories of the Indian Nation, to the south of us, New Mexico, Arizona and part of the great State of Missouri, on the banks of the Missouri

River, and with a net-work of railroads (of which ten are in active operation, two are being built, and more are in prospect,) diverging to every point of the compass, we repeat, there is no better point for exhibitions by artists, mechanics and manufacturers, of specimens of their productions, of which they desire a successful introduction.

Steam power will be provided on the grounds of the Exposition, so that machinery of all kinds may be seen in active operation, and be tested to its greatest advantage.

Arrangements will be made with all railroads for the transportation of articles for exhibition, visitors, etc., at favorable rates.

Our grounds are large and commodious, and ample arrangements will be made for the accommodation of visitors and their articles while in the city.

Further information, list of premiums, etc., will be cheerfully and promptly furnished on application. Address,

INDUSTRIAL EXPOSITION,
Kansas City, Mo.

About the same time, the premium list was published, offering between $15,000 and $16,000 as premiums in the various classes of industry and production.

The press of the city was very liberal in its aid, and, in fact, the papers all over this State and Kansas assisted us largely by favorable notices and comments.

But the greatest element of success consisted in the entire harmony and unanimity which prevailed from beginning to end among the officers, committees, and all others connected with it. Every citizen became deeply interested in making the Exposition a perfect success, and labored assiduously to that end. The committees were selected from all classes, and from all portions of the city and county, and the utmost interest and zeal governed them in all their labors. Even the railroad companies aided us all in their power, by reduction of rates and liberal subscriptions.

[*Extract from the Kansas City Times, October* 15, 1871.]

The ground upon which this grand fair will be held is in the south-east portion of the city. A part of it is open ground, laid out for race track and amphitheater. Outside of this level space is a beautiful running brook, abounding in springs of pure water. This brook is spanned by a bridge, across which is a beautiful shady grove. The location is central and pleasant.

THE AMPHITHEATER.

Directly in front of the Sixteenth street entrance, and the first object to attract the attention of the beholder, is the large amphitheater; this structure is circular in form, and almost two hundred and eighty feet in its extreme diameter; directly in the center is a small stand to be occupied by the judges when witnessing the exhibition of the various animals as they are paraded around the circle, or "track;" this track will be reached by means of openings made under the seats and promenade of the amphetheater.

It is the intention of the managers to make this structure a favorite resort for those attending the exposition; it will have a seating capacity for nearly six thousand persons; the seats will follow the circle of the track, and will rise one above the other, somewhat after the style of seats in a circus; but unlike the latter, they will be boarded up on the under side. Beyond the outer circle of seats will be a spacious promenade, twelve feet in width. It can be reached from the ground by either of four flights of broad stairs, and will be capable of accommodating some five thousand persons—it will afford a fine view of the race track, as well as of the entire grounds. Beneath the outer ranges of seats will be a series of forty commodious booths. They will be sold or rented to the highest bidders.

Just north of the amphitheater, and facing toward the south, will be erected

THE MAIN OR CENTRAL BUILDINGS.

They will be large and commodious, and will contain all the art treasures of the exposition. They will also contain the various products of the soil, as garnered by the husbandmen of California, Colorado, Kansas, and the States east, north and south of us.

It is expected that the display of agriculture and of horticulture will be very fine. Fruits, flowers and plants from all parts of the country will be brought side by side and placed in competition.

The vegetable and mineral worlds will not be forgotten. The gems of the land will here find an abiding place. The inventor and the artisan, the designer and constructor, will be brought together.

In passing through the various buildings, we shall see exhibited, in regular order, skillful productions from the foundry, the work-shop and the studio. All this will do us good; it will teach us more of the world, and will cause us to better appreciate the wealth of our land; pleasant memories will linger after the exposition shall have ceased to be, and the thoughts of the things seen will produce in us a joy forever. But in thinking of the things "to be," let us not forget our purpose. Space forbids extended reflections, so we will hasten on, and give our readers a

DESCRIPTION OF THE BUILDINGS.

The various buildings are grouped together in one irregular mass, the central building of the group being the largest and most prominent, its exterior angles relieved with small turrets, and the roof of the central portion rising above the rest to afford light and ventilation. The building has three broad entrances at each end, and on each side of these are offices for the superintendent, executive committee, and the various officers connected with the exposition. The floor space of this building will be devoted to household articles and textile fabrics. Along the sides will be placed shelves, counters and booths, for the display of the lighter manufactured goods of all kinds. Some of the booths will be devoted to the production of our home industries. This will be one of the most interesting features of the exposition. There will be a broad gallery extending around the interior of the building; it will be twelve feet above the ground floor, and will be reached by four broad flights of stairs. This gallery will be used for the exhibition of the light and delicate fabrics woven by the dainty fingers of the fair sex, and will be placed under the charge of the ladies. This place will afford a delightful promenade, and will be the resort of the young of both sexes. In one end will be placed an instrumental band; so that taken altogether, it will be a very pleasant place in which to while away an hour, and watch the moving panorama below.

Reluctantly leaving the gallery, we descend the north stairs, and at once find ourselves in the Floral Department, and near the large fountain situated at the intersection of the transverse wings.

THE FOUNTAIN

will be some twenty feet in diameter, and will be supplied with numerous jets. The water supply for this will be from the creek, and will be forced through the pipes by means of the steam engine or pump, in the machinery department.

Leaving the main building, we pass along one of the wings devoted to the exhibition of coopers' ware, wooden ware, willow ware, carpenters' and joiners' work and house furnishing goods. After a time we reach the east wing. Just as we enter, a large placard stares us in the face, and on it we read the words "Farming Implements." Sauntering along, we soon find ourselves in the midst of hay-rakes, wool-picking and flax-dressing machines, horse powers, cultivators, corn planters, and farming implements of all kinds. Just outside the building, we see reapers, mowers, threshing machines, and the heavy articles of this class.

Retracing our steps, we again reach the central building, pass the fountain, and enter the west wing. Here we see trunks, leather goods, household and other furniture, carpets, minerals, building stone, ornamental stone, marble and glass work. Next comes scientific instruments, gold, silver and bronze goods, stationery, etc., etc. These are arranged along the sides and down the center of the building. Passing on, we quietly enter

THE HALL DEVOTED TO THE "FINE ARTS."

This is a roomy structure, lighted from the roof, and devoted to sculpture, painting, architecture, and the sister arts; pictures cover the walls, and statuary, carving, etc., occupy the central floor space.

At last we have reached the end. Let us stroll over the grounds, and see the out-door sights. We soon reach the race track, the judges' stand, and the "grand stand." To the north-east we see the approach from Twelfth street, and within the inclosure its extension toward the grove on the east of the race track. Near the south-eastern corner is another approach for those living south and east from the city. These two approaches, or drives, are for vehicles and pedestrians. The Sixteenth street entrance will be used for "pedestrians only," as it is the intention to exclude all horses, carriages, etc., from the space to be occupied by the central buildings. The machinery sheds will be placed east of the track and next to the water. Just east of the race track are several flowing springs of pure water. These form quite a stream, and, after being dammed up, will furnish an abundant supply of water for the stock, and for all other purposes connected with the fair. Some two or three bridges will be built over the stream for the purpose of connecting the driving park with the grove.

Just east of the stream, and in the north line of the inclosure, will be placed the sheep pens and cattle sheds. The horse stalls will connect with the cattle sheds, and then the stalls for mules, jacks and jennets. The foregoing pens and sheds will form three sides of a quadrangle, and within this quandrangle will be placed the pens for swine, the poultry house, etc., etc. The portions of the grove not used for the purposes just stated will be assigned for those persons coming in vehicles and on horseback; and as the entire grounds will be inclosed with a high board fence, and watchmen placed at intervals within the inclosure, it will afford a safe and pleasant place for all parties who may wish to enjoy a quiet "picnic" upon the grounds.

The number of entries for competition was nearly four thousand, and the display in the different departments was exceedingly large and fine. Col. Colman, as well as several others, declared that the exhibition of stock exceeded that at the St. Louis Fair, in numbers as well as quality, while the display of fine fruit was pronounced unsurpassable by all spectators.

The arrangement of the buildings for the display of machinery, textile fabrics, fruits, vegetables, fine arts, etc., was such as to give to exhibitors an unusually good opportunity to show their goods, and to visitors to inspect them, being beautifully and thoroughly lighted at night with gas furnished by the Maxim Gas Machine Company, of New York. There was a large attendance in the evenings as well as in day-time, and the night entertainments were a marked feature of the Exposition.

The weather was unexceptionably fine, and the attendance very large. It is believed that there were from 35,000 to 40,000 people on the grounds on Thursday, and a very full attendance at all other times. No accident of any kind happened, and every one seemed satisfied and gratified.

Nineteen States were represented in the Exposition by their manufacturers or producers, which is a very gratifying circumstance to the managers, when it is remembered that ours was almost the last fair of the season, and that exhibitors must necessarily have become pretty well worn out, and anxious to get back to their homes before the disagreeable weather of late fall commenced.

A new and perfect organization has lately been effected, in the shape of a joint stock company of $100,000 capital, which has already

procured a beautiful tract of 97¾ acres, just outside the city limits, and is proceeding rapidly to put it into the best possible condition for the next fall's fair, which will be held the last week of September, being immediately after the Kansas State Fair, and immediately before the St. Louis Fair.

K. COATES, *President.*

THEO. S. CASE, *Corresponding Secretary.*

ANNUAL REPORT

—OF—

C. W. MURTFELDT,

(LATE CORRESPONDING SECRETARY,)

FOR THE YEAR 1871.

REPORT.

The State of Missouri lies between 30° and 40° 80′ north latitude, and betwen 11° 45′ and 18° 50′ west longitude, and contains an area of 67,380 square miles. In a territory so extensive there will always be great diversity of climate, which will of itself account for damages by or freedom from frost, for abundance of rain or drouth; so that, taking the whole State together, it may truthfully be written of every season that it has been an extraordinary one.

The success of no other occupation depends so much upon propitious seasons, upon timely rains, and genial warmth, as that of the agriculturist. A severe late frost, like that of April 22 and 23, may damage the fruit crop in the central counties of the State, while two or three tiers of counties on the southern borders of the State escape, because the frost does not reach there; and the northern part of the State escapes also, because the fruit-buds are not far enough advanced to be injured by the frost. Plenty and timely rains and genial skies may cheer the farmers on our western border, while the eastern section is actually suffering from severe drouth. Such, indeed, were the actual conditions of the season of 1871, as experienced by Missouri.

Notwithstanding all these vicissitudes, the labors of the husbandman have been well rewarded, and plenty has crowned the year.

> Garnered are the pliant, weighty sheaves of grain;
> The fragrance of full mows the barn is filling;
> The cribs can scarce the bounty of the maize contain,
> While cellar, bin and vat are full to brimming.

That is, speaking of the State as a whole; for there are local failures of specific crops. The people of Missouri, and their flocks and herds, have been blessed with general good health, and have abundant cause of gratitude to Almighty God, for his signal favors and many blessings.

In a review of the condition of agriculture in Missouri, it will be expected that the Corresponding Secretary show in detail, as far as the data at hand will allow, the condition of the leading crops produced in the State, and that he make such suggestions as, in his judgment, shall be deemed prudent, in order to advance the general prosperity of all its citizens.

In a State so largely agricultural as Missouri, where all the ramifications of trade and commerce hinge to a large extent upon the success of the farmer, or, in other words, upon abundant harvests and remunerative prices for produce, it will not be necessary to dwell at length upon the fact that successful agriculture underlies all general prosperity. A brief review of each of the leading staple productions of Missouri will be found of interest; while, for a more specifically local account, the Secretary begs leave to refer to the reports from the respective counties, and to the carefully prepared tables annexed.

WHEAT.

The condition of the wheat crop, up to March 1st, was all that the most ambitious farmer could desire. The area sown was considerably larger than that of the previous season. True, some counties, and among these Moniteau, Cooper and Pettis, reported some damage to the plant by Hessian fly, but the general condition was healthy, promising an abundant harvest. As the season advanced, however, a general drouth set in, the tillering of the plant was checked, its growth became stunted, and, forced by the more direct rays of the sun, it sent up but few stalks, and thus the fair promises of spring were not fulfilled. An unusually early harvest revealed the fact of a greatly reduced crop, with short straw and short heads, and these only partially filled, but a good berry — the entire crop falling below the average 3-100; perhaps more; for at the time the estimate was made by the Department, the separator had only in part performed its work.

As to the prospective prices, several points must be taken into consideration. It seems to be pretty well ascertained that the cool and humid summer experienced by England has proved a hard season for the wheat crop. France, and other sections of the Continent, also, will be necessitated to import wheat to a considerable extent, and America will be one of the main sources from which these countries will draw. To show the points to which breadstuffs are exported, as well as to give a faint idea of the extent of the exportations, the following brief letter to the Missouri Democrat is here introduced:

"New York, Nov. 11, 1871.

"The exports of breadstuffs to Europe, for the week ending last night, are as follows:

"Total shipments of wheat to Europe, 611,143 bushels—287,088 bushels less than last week; Liverpool, 194,518 bushels; London, 97,833 bushels; Glasgow, 116,094 bushels; Penarth, R. F. O., 22,313 bushels; Galway, 15,156 bushels; Cork, F. O., 52,843 bushels; Havre, 29,744 bushels; Caen, 12,544 bushels; Antwerp, 65,190 bushels; Lisbon, 14,328 bushels.

"Total corn, 261,895 bushels—47,939 more than last week—divided between Liverpool, Glasgow, Galway, Cork, F. O., Havre and Bremen.

"Total flour, 14,728 barrels—10,300 more than last week; Liverpool, 8,620 barrels; London, 2,039 barrels; Glasgow, 3,876 barrels; Rotterdam, 200 barrels.

(Signed) B. T. BAKER & CO."

The accounts of the grain crops of Europe are not encouraging. It has been ascertained that both Germany and Italy will have to import largely, and in the Prussian States, Pomerania, Posen, Brandenburg and Silesia, the yield is small; while the crops have wholly failed in Saxony, Hanover, Westphalia and the Rhineland. In Russia the wheat crop is generally a failure. The northern parts of Russia are gradually declining as wheat growing provinces. The grain crops in Sweden, Norway and Denmark are below the average. The barley crop is comparatively a failure in Germany, but the oat crop is large. The Minister of Agriculture in Italy has published a statement that the yield of corn is very poor, except in one province. Along the Mediterranean shore the yield has hardly equaled what will be needed for home consumption. There are no accounts from Hungary, which is now the reliance of Europe for wheat. The deficit in the European stock will have to be drawn from the United States.

Added to this is the fact that in the North-Western States, owing to the severe and protracted drouth, not nearly an average area has been sown, which will proportionately reduce the crop of 1872, and have its influence upon the market before another harvest.

SPRING WHEAT.

In sections of our State where the chinch-bug damaged the spring wheat in 1871, and the counties adjacent, it is not recommended that spring wheat should be sown. But in other parts of Missouri, where lands are well prepared and naturally adapted to the growth of wheat, spring wheat should be sown to augment the crop of 1872, at least so far as to supply all local demand.

CORN.

Corn is the crop of the season. The early opening of spring favored early planting, while the dry time of May and June favored frequent and clean culture. In most sections of our State sufficient rain seems to have fallen at the critical periods of the growth of the plant to perfect it, (greatly aided, of course, by frequent cultivation,) and the result is a really splendid crop, rated 112-100 by the Department. Nevertheless, it is certain that the crop would have been much larger, in fact unprecedentedly large, had a more abundant rain refreshed the growing maize at the time of the filling of the grains.

So much depends upon this crop in the whole economy of the farm that the introduction of a quotation from an experienced farmer will be pardoned. Said he: "Whenever I am blessed with a good crop of corn, I have, also, fat horses, fat cattle, fat swine, fat poultry, plenty of milk, butter, cheese and eggs; but when my corn crop fails, all this is reversed, even if I have an abundance of wheat, which I generally haul to market, without retaining so much as the offal to feed my stock."

At least one-half of all the arable land on every Western farm ought to be devoted to the cultivation of corn, for the reasons assigned by our farmer friend, just quoted. That corn, in its varied form of hominy, meal, starch, etc., is a valuable adjunct to every farmer's table, is a well-known and admitted fact. Too bulky, in proportion to its value, to be hauled to market, for any great distance, its price will range low in parts remote from large markets, but the high price of wheat will have its influence upon the price of corn.

OATS.

This crop delights in a cool, humid spring, which, as has already been stated, was not the character of that season in 1871. In exceptional localities very early sown oats yielded a fair return, but the oat crop, as far as Missouri is concerned, proved a failure. The reports from Iowa, Kansas, Wisconsin and Northern Illinois show an abundance of this grain, and of a superior quality, so that prices will not range very high. Missouri will have to buy or do without. The highest average report for the State is 50-100, or half a crop. The introduction of new and fresh seed from the North has always been attended with satisfactory results, and is, therefore, earnestly recommended.

BARLEY.

Except a few fields of winter barley, the crop, as a whole, must be rated at much below the average. If harvested in good condition—viz: showing a uniform bright color—it will find a ready market and at remunerative prices. Some of the North-Western States report a crop above the average. Those of our farmers who sell to brewers will, perhaps, realize better prices if they will hold their barley until February, March being the month in which most of the brewing is done.

HAY AND PASTURES.

The attentive reader will have come to the conclusion that, with a season so deficient in rain-fall, the crop of hay must have been small, and pasturage scant. Such are the facts; but for the seasonable planting of fodder-corn, more generally practiced this season than ever before, there would now be a great scarcity of fodder for stock. Milch cows and fattening stock have required extra feeding, in addition to the ordinary pasturage, ever since the month of August, and on many a farm where this has been neglected, the present condition of the stock shows that it would have been wise economy to have given the extra feed and care ever since that time. Pasturage has been very short, and is reported in many counties so dried up that it would burn were it set on fire. (Department Report for October.) Hay, near a large market like that of St. Louis, is always in demand, and brings high prices. A crop of two tons per acre (not an extra

large yield,) will bring the grower more net profit than either a crop of wheat or barley; for a corroboration of this statement, we refer to the letter of Thomas G. Settle, President St. Louis Farmers' Club.

TOBACCO.

The crop of 1871 is a full average, and prices for good leaf, bright fillers and medium to good wrappers, are well up, and likely to be sustained. As will be seen in the tables annexed, the crop is raised as a leading specialty in but few counties.

HEMP

Is not a leading crop in any county, so far as I have been able to ascertain, yet it forms one of the staple productions of Missouri, and generally yields a fair return, whenever intelligently cultivated. Within the year, an opposition crop appears in the so-called "Indian Hemp," "Mormon Weed," etc., botanically known as *Abutilon*, or *Sida*, belonging to the family *Malvaceæ*. This needs no cultivation; in fact, it is one of the most abominable weeds, and as such, a pest to every farm on which it has obtained a foot-hold. It furnishes a fiber at least equal in strength to the best Russia hemp. It is claimed for this fiber that it will take and retain color better than hemp, thus favoring its use for matting and similar fabrics. It has already been manufactured into all kinds of cordage, and a quality of paper adapted for printing. It seems to have spread from Kentucky southward, and also into Missouri and Illinois, and can be found in large quantities on the bottom lands of these States. No sane farmer will ever allow it to grow on his lands.

FRUITS AND WINE.

In this introductory report, the Corresponding Secretary has purposely refrained from giving a review of the fruit-crop, including, of course, grapes and wine, in order to economize space. The proper *status* of these will be given in the annual report of the State Horticultural Society, and that of the Mississippi Valley Grape Growers' Association, which have usually been embodied in the volume of agricultural reports.

LIVE STOCK.

If, as already stated, agriculture underlies all general prosperity in a State so largely agricultural as Missouri, it may, with equal force, be asserted that the rearing and fattening of stock, and the consequent production of manure, underlie all successful farming. Hay and straw are of comparatively little value as manure; but being converted into animal excrements, and as absorbents of liquid manures, they form the bulk of fertilizers produced on the farm. "Without animals, no manure; without manure, no crops," seems to be the

motto of our best economists. In order to keep the farm from "running down," a sufficient number of domestic animals must be kept to convert into manure all the hay, straw and other fodder produced on the place. Again, all the corn, oats and other grain generally raised for feeding and fattening purposes, should be converted into beef, pork, wool, mutton, butter, eggs, etc., on the farm where it was produced, and it should be fed to such kinds of stock as will yield the largest and best return, viz: blooded, or high grades of cattle, swine and sheep.

Having had the opportunity, as well as pleasure, at the fairs, to notice the improved stock of prominent Missouri breeders, and being able also to compare the stock (in my mind) with the few head owned and exhibited by some of these same breeders a few years ago, it is with great satisfaction that I refer here to the greatly increased introduction, as well as to the superior excellence, of blooded stock into the State. Missouri, at present, has quite a number of short-horn herds that will compare favorably with any in the land; while the number of Jersey, Ayrshire and Devons are also greatly on the increase, so that almost every county has superior breeding animals of this stock.

Increased attention has also been given to the introduction and breeding of blooded swine. So generally is this the case, that at every county fair which I have visited, and many of which reports have been received, the exhibition of a greatly increased number of the finer and better breeds of swine formed a leading feature.

In sheep, alone, there is a positive decrease, which is to be regretted, for no class of stock pays better when well taken care of. If asked to assign a reason, I would answer, in one word, of four letters only, "dogs;" the damage by wolves is comparatively small; besides, the number of wolves could, and would, be greatly reduced by faithful and persistent hunting. The farmers must still "*pray*" for a law that shall hold a man's real and personal property for the damage his worthless cur may do, which damage should be assessed at such rates as to be both exemplary and punitive.

EDUCATORS OF INDUSTRIAL UNIVERSITIES, ETC.

Two significant events have taken place during the year, to which the Corresponding Secretary deems it his duty to call the attention of the Board, viz: the convention of Presidents and Professors of Agriculture in the Industrial Universities, established under the Congressional land grant, and others interested in the education of the industrial classes, held at Chicago, August 10, 1871, a full report of which is herewith submitted. Your Corresponding Secretary had the honor to be present at this convention.

STORM SIGNALS.

The other event referred to is that of the establishment of the so-called "signal service," under the direction of the War Department of the United States, introduced primarily for the benefit of the commerce of the United States, but which it is the intention of the Department to make subservient also to the interests of agriculture. I have the honor to submit the correspondence of the War Department with this office:

WAR DEPARTMENT, OFFICE OF THE CHIEF SIGNAL OFFICER,
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE,
WASHINGTON, D. C., July 18, 1871.

MR. C. W. MURTFELDT,
Secretary of the Missouri State Board of Agriculture.

SIR: Under a Joint Resolution of Congress, approved February 9, 1870, a copy of which is hereto annexed, the duty was imposed upon the Secretary of War of causing meteorological observations to be taken, and of giving notice by telegraph and signal of the approach and force of storms. By order of the Secretary of War, the Chief Signal Officer of the Army is specially charged with the execution of this duty.

It will be observed that the language and original intent of the resolution contemplated directly the benefit of the commerce of the United States. Indirect advantage would naturally accrue to other industries, but it is certain that the reports of this Division may be made directly useful to agriculture, since, after sufficient notice, the operations of the farm might frequently be so ordered as to avoid the serious losses occasioned by storms. It is also true that the observations taken and made public, which involve particulars regarding heat, moisture, wind, rain, cloud and electricity, from which statistics valuable for particular localities are compiled, and general laws relating to climate can be deduced, must be of importance to every scientific or intelligent agriculturalist.

The Secretary of War has directed the Chief Signal Officer to render the work of this Division available for the benefit of agriculture, to the full extent of the power so far granted by law, and of the facilities attained or attainable by this office, the latter being limited by the appropriations made or to be made by Congress.

The following-named stations are now established, viz.:

Portland, Me.	Norfolk, Va.	Grand Haven, Mich.
Boston, Mass.	Oswego, N. Y.	Escanaba, Mich.
New London, Conn.	Rochester, N. Y.	Marquette, Mich.
New York City, N. Y.	Buffalo, N. Y.	Davenport, Iowa.
Philadelphia, Pa.	Cleveland, Ohio.	Leavenworth, Kansas.
Baltimore, Md.	Toledo, Ohio.	Cairo, Ill.
Washington, D. C.	Detroit, Mich.	Cape May, N. J.
Wilmington, N. C.	Chicago, Ill.	Galveston, Texas.
Charleston, S. C.	Milwaukee, Wis.	Memphis, Tenn.

Savannah, Ga.	St. Paul, Minn.	Nashville, Tenn.
Augusta, Ga.	Duluth, Minn.	Cincinnati, Ohio.
Lake City, Fla.	Pittsburg, Pa.	St. Louis, Mo.
Key West, Fla.	Knoxville, Tenn.	Omaha, Neb.
Mobile, Ala.	Indianapolis, Ind.	Cheyenne, Wy. T.
New Orleans, La.	Lynchburg, Va.	Corinne, Utah.
San Francisco, Cal.	Burlington, Vt.	Mt. Washington, N. H.
Keokuk, Iowa.		

It is intended to increase this number gradually, as the requisite telegraphic connections can be obtained, and competent observers can be enlisted and instructed.

At every station three synchronous observations are taken daily, and telegraphed immediately to the central office; being also published in whole or in part at other stations. At all stations bulletins are issued within an hour after each of the three daily reports are received, and, besides being posted in public places, are furnished gratuitously to the press—the morning bulletin for the afternoon, and that of midnight for the morning papers. At the more important stations a weather map is also issued each morning. A copy of the weather map and bulletin of this date is enclosed herewith.

A paper, showing the synopsis and probabilities of the weather, is also prepared at this office immediately after the reception of each of the three above-mentioned reports, and is furnished the Associated Press for distribution throughout the United States.

In addition to the above-mentioned observations, three others are taken at intermediate hours, the reports of which are not telegraphed, but mailed, and recorded, and, embracing further particulars, are specially designed for use in obtaining local statistics and establishing meteorological laws.

That part of the duty required by law "to give notice on the northern lakes and the seaboard, by magnetic telegraph and marine signals, of the approach and force of storms," will, on the display of signals on the shores mentioned, (for which arrangements are now in progress,) be in regular performance. It is, however, the desire and intention of this office to perform its duties, under the instructions received, in such manner as will be most useful also to the agricultural interests, and the intelligent views of gentlemen interested in the latter, as to such modifications of or additions to the present work as can consistently be adopted, with the above-mentioned object, are invited and will be attentively considered.

It is believed that the co-operation of agricultural and horticultural societies with this Office will best conduce to success in the object to be attained, and it is suggested that practical form be given to such co-operation by the appointment, on the part of your Society, of a permanent committee to confer from time to time with the Chief Signal Officer of the Army, and to take, in conjunction with him, such steps, or to recommend for the consideration of the Society such action, as may be deemed desirable. Committees of a similar char-

acter have been appointed by many of the boards of trade and chambers of commerce throughout the country, with great benefit to this service as specially relating to commerce, and it is hoped that a corresponding advantage will be obtained from the selected intelligence of gentlemen interested in agriculture.

I am, Sir, very respectfully, your obedient servant,

ALBERT J. MEYER,
Brig. Gen. and Chief Signal Officer of the Army.

[PUBLIC RESOLUTION—No. 9.]

JOINT RESOLUTION to authorize the Secretary of War to provide for taking meteorological observations at the military stations and other points in the interior of the continent, and for giving notice on the northern lakes and seaboard of the approach and force of storms.

Be it resolved by the Senate and House of Representatives of the United States of America, in Congress assembled, That the Secretary of War be, and he hereby is, authorized and required to provide for taking meteorological observations at the military stations in the interior of the continent, and at other points in the States and Territories of the United States, and for giving notice on the northern lakes and on the seacoart, by magnetic telegraph and marine signals, of the approach and force of storms.

Approved February 9, 1870.

As in duty bound, the Corresponding Secretary submits a brief account of "the tour of observation," made by members of this Board, the officers of the State Agricultural Society of Kansas, and invited members of the excursion, through the State of Kansas and parts of Colorado Territory, which is hereunto annexed.

TRIP TO THE ROCKY MOUNTAINS.

A pleasing history of the trip of the Missouri and Kansas State Boards of Agriculture has been presented by "Rusticus," in Colman's Rural World.

Our version of the trip may be considered as supplementary, because we refer to other facts, of interest, we hope, to the farmer-readers, and also because we wish to do full justice officially to all the gentlemen connected with the several railroad companies who so signally favored this excursion.

While on the subject of railroads, we may be allowed to express a thought or two, not because they are new, but because they are not often dwelt upon with sufficient force. Railroad land grants are frequently made a point of attack by politicians; it is asserted that they are a squandering of the public domain; that Uncle Sam will some day become a very poor man, etc. Now, in the light of our recent trip, and viewed from a practical stand-point, we say that there

is not, in this wide world, a power for good to this nation, greater than the opening of these great national highways. Where is the West so often spoken of in former years? Echo answers, where? These iron bands (wire and rail) have annihilated it by annihilating space and time. Oh! the long and weary days of travel of the slow, creeping emigrant trains, seeking the West on a houseless, treeless, arid plain, which affords no shelter from the scorching rays of the sun, nor against the storm of rain, or hail, or snow; to-day, we, in thirty-six hours, travel over all that portion of the so-called "Great American Desert" which lies east of the Rocky Mountains, and with less actual fatigue than we would endure by traveling twenty-five miles in a common lumber wagon on a common country road. Merchandise, which, because of its bulkiness, would not bear transportation on account of expense, is now easily handled and carried to its destination in a very short time, and at a profit. Not only so, fertile fields and fruitful hills are brought within the pale of civilization, and the country, which so recently was occupied by the buffalo, the elk, the antelope, the coyote, is become a dwelling-place for man. Thousands of happy homes, surrounded by well-fed herds and flocks, and luxuriant crops, hamlets, and even cities, with all their humanizing and christianizing influence of schools, seminaries, colleges and churches, spring into being as in a day, when once the iron bands unite the newer with the older country. This would not have been—at least not for hundreds of years—but for the railroads. We know, also, that in point of fact, Uncle Sam does not lose a dollar, charging double, as he does, for the alternate sections of land still his, and lying within the railroad belt—while the States gain a much greater revenue and a consequent lower rate of taxes by the increased value of property.

But to return to our narrative. After the welcoming speeches and the responses at Atchison, Major Downs, the Superintendent and Land Commissioner of the Central Branch of the Union Pacific Railroad, invited the excursion party into his office, to inspect, not only specimens of cereals of the crops of former years, neatly preserved in glass jars, but corn, (in the stalk,) wheat, rye and barley, (in the straw,) of the growing crops, all of great promise. Major Downs is evidently the right man in the right place, and the citizens of northeastern Kansas of to-day, and all future time, will have cause to rejoice that so fit a man has been chosen for his position. The development of this part of the State has been confided to faithful hands, a clear head, and a true and manly heart.

FENCES.

Being familiar with all the expedients and substitutes for fences resorted to on the Illinois prairies before the day of railroads, we had them all pass in review—not in vision, but in fact—on the prairies

between Atchison and Waterville, and in fact all through Kansas. What folly to cut down the finest trees in the groves to be split into posts or rails, especially when trees and groves are small and few, (comparatively,) and prairie farms large and extensive.

Here we have sod fence (adobe) and ditch, wire fence, with posts a rod or more apart, pole and post fence (never secure), to be renewed every three or four years, "galloping" pole fence, Virginia rail, and every other expedient the fertile brain of man can conjure up—all, all like a cancer eating out the substance of the land—an aggravation, an eye-sore, an abomination, a fraud and a stupendous folly. If the money expended on these no-security fences, and the amount of damage done to crops, were expended in the building of substantial post and board fences around pastures to inclose the live stock, how many tens of thousands of acres could be given to the plow and to crops at once! But, "there is a good time coming—wait a little longer."

AT WATERVILLE

We noticed a large block of gypsum, largely used as a fertilizer in Ohio, New York and other States. This had been taken from the quarry near the entrance to the church where the banquet was spread, evidently to attract the attention of the agriculturists. It is found near Waterville, is very pure in its composition, and will prove of great value when once the lands are seeded to clover, etc.

BLUE RAPIDS.

This town is the enterprise of a New York colony under special charge of Rev. Muzzy. The water-power at this place is one of the best west of the Alleghany Mountains. The Blue River runs here over shoals, which will allow of the same water being used as a motive power for a succession of mills, also for elevating so much water as shall supply every house in the city and the public fountains. Grist and flouring mills, woolen factories, and, in fact, all other factories, known to the genuine Yankee, will form the basis of industries at Blue Rapids, and the good agricultural country surrounding this city will give impetus to trade and commerce. We are of opinion that this place has superior advantages, as well as a good, stiff, moral back-bone, and we can not help calling upon God to bless the people and the place. It is a city of only eighteen months' growth.

THE HOMES OF LEAVENWORTH.

It is worthy of notice that you can not find a man—at least we failed to find him—that owns a lot or an acre of ground in this city that does not speak of it as his home, which he loves, which he means to improve, and where he means to spend his days. Every one knows that Leavenworth, like Rome in its glory, sits like a queen upon her

seven hills. Looking from the tower of the public school building over the handsome residences and compact business blocks of the city, one can not fail to be impressed with its commercial importance, as well as its beauty and wealth. The government military post and reserve, which answer well for a public park to the city, form one of the chief attractions of Leavenworth. The valley of Salt River, seen from the western hills of the city, is very lovely, while all the hills round and about are well adapted to fruit and vineyard culture. Take it for all in all, and we can readily see why the people love the place, and delight to call it home.

The excursionists left the homes of Leavenworth by a branch of the Kansas Pacific road for Lawrence, the city of historic fame. Of the country between the two points, much is covered by woods and young timber. We overheard the remark of President Mudd that he would like to visit that locality for shade and ornamental trees, for the reason that the young trees were very shapely, stood in rather open ground, which would be favorable to the life of the tree in tranplanting, and embraced the elm, coffee tree, and other esteemed sorts for roadside and ornamental grounds.

The train upon which we rode was what is technically known as a "mixed" train—freight and passengers combined—and proved a slow coach.

A pleasing little incident occurred this afternoon, the first instance we ever knew of the "iron horse" being mistaken for a thing of life, if not of beauty. A young colt fancied that the iron steed was its dam, perhaps in the act of decamping from a cruel master, or on divorce intent, or on some other mission, and anxious to leave her "responsibility" behind her. The colt had no notion of doing without the lacteal just yet, and so kept up a pretty fair race with the locomotive for over a mile, including a short stoppage. Col. Colman improved the opportunity of the stop to inform colty that its mother did "not know it was out," but, like real folks, it would not be advised. In its second race it was finally overhauled, and arrested in its headlong course by the well-known whinny of its dam, who, with her owner on her back, had overtaken the truant.

Arriving at Lawrence about dusk, carriages were found in waiting, and the entire party were welcomed as the guests of the Hon. I. S. Kalloch, the President of the Kansas Agricultural Society. All the excursionists are very sensible of the generous and kind attentions of their host, who permanently resides at Lawrence. No one can doubt the executive ability of Mr. Kalloch, and we advise our Kansas friends to allow the gentleman to fill his present position as long as the law will allow.

Mr. Kalloch and some of the leading citizens of Lawrence had planned a trip over the L., L. and G. road—our slate must be broken, and we must go to Humboldt now. When you are in the hands of men to whom obstacles and oppositions are but so many spurs, and

who will have their own way any how, it is best to submit quietly, and this we did, and we have had no reason to regret it; so to Humboldt we did go. Stopping at Vineland, we picked up Mr. Barnes, but before leaving, had an opportunity to visit his nursery, vineyard, orchard, etc. Here is another instance of what a live Yankee, with his frugality, sagacity and enterprise, can accomplish in a few years in a new country. Space forbids a more detailed account of Mr. B.'s labors and success; but if any one doubts that even the so-called barren hills of Kansas will produce all manner of trees and fruits pleasing to the eye, and pleasant to the taste, let him visit the home of Mr. Barnes.

It may as well be placed on record here, as elsewhere, namely, the fact that the most highly esteemed, the best cultivated, the finest ornamented, and most desirable grounds one meets with anywhere, either in Illinois, Missouri, Iowa or Kansas, yes, even in Colorado, belong to nurserymen and fruit-growers.

One of the many places, or rather cities, passed on this trip was that of Iola, where the co-called Iola Bridge Company is located. We understand that, with the usual sagacity and forecast of the Kansans, the people of this place gave the manufacturers of the "King Bridge" $60,000 to locate their factory at this place, and name the bridge as above. The bridge at Blue Rapids, and two at Manhattan, were built by this company, and are models of strength and beauty combined.

Ottawa, one of the first points of operation and observation of our friend, S. T. Kelsey, a member of the Kansas Board of Agriculture, is a lively, wide-awake city, less than half-a-dozen years' growth. It lies in the midst of a splendid, well-watered, agricultural country, has fine educational and social advantages, a well-conducted journal, a real *bona-fide* park of twenty-three acres, and aspires to have a State fair. Mr. and Mrs. Fales, corresponding editor of the journal, who reside here, were incorporated with the excursion on the return of the train, and accompanied the party to the Rocky Mountains. Mr. F. is master of the "King's English," and we are anxious to see his account of our trip. We were sorry that our stay at Ottawa was necessarily brief. Had we been able to have our way, this excursion over the L., L. and G. road would have been reserved to the last; we would then have proceeded to Fort Scott, thence to Baxter Springs, thence into Jasper county, Mo., and home by the Atlantic and Pacific road; but this was not to be.

Arriving at Humboldt about dinner time, we experienced another of those pleasant affairs which fell to our lot while in Kansas — carriages, dinner, kind words of welcome and the best of wishes for a successful trip. While memory lasts and reason sits enthroned, not one of our party will ever forget these unnumbered acts of love and good will.

On our return to Lawrence, the citizens again met us at the train with their private carriages, drove us through the principal streets and environs of the city, past fine private residences, and up University Hill, from which we had a view of the magnificent country spread out before us like one grand and enchanting panorama. We could not help calling to mind the struggle for the possession of this goodly land. To-day we, from Missouri, came on a mission of peace, which should all the more closely cement the friendship and harmony of the citizens of two States, both to-day rejoicing in universal freedom. Instead of burning cottages and fleeing families, we behold, to the eastward of a glorious sunset, the fields ripe for the harvest, while the dark green of the maize gives promise of the golden ears to be garnered later in the season, the whole picture intermixed, in beautiful mosaic, with herds of fat cattle, the milky mothers of the herd lazily following the tinkling bell of their leader homeward, to offer their full and distended udders to the gentle hand of the dairy-maid for relief. We were not long allowed to muse upon the beauty of the scene. Our attention was called to the beautiful and truly magnificent building at whose base the cavalcade had halted. This is the new building designed for the chief educational institution of Kansas — the State University. It is as yet incomplete, its exterior parts only being finished; but, if the interior is finished in harmony with the outside, and the instruction here imparted shall be as solid, symmetrical and complete as this building, Kansas will have reason to be proud of her University. May the most abundant and satisfactory success crown all the educational and industrial efforts now being developed by this young State, thus giving a correct intellectual, moral and religious foundation for true manhood, and a prosperous and happy people.

Leaving Lawrence and President Kalloch behind us, at one o'clock A. M., we traversed a hundred miles or so of the Kaw Valley without seeing much that could be noted here. Lecompton, Eugene, Topeka, St. Mary's Mission, and many other towns, were left to the east of us when the morning dawned. We just caught a glimpse of Manhattan as we passed. All through this beautiful valley we saw abundant evidences of thrift and successful farming: the waving wheat-fields nodded their heavily loaded heads as we passed, and, we fancied, bade us God speed, and a successful trip; the color of the corn was so green as to be almost black; all other crops, even to castor-beans, looked well. In Ripley, Davis, Dickinson and Saline counties we saw the finest and best wheat-fields of any place on the whole trip. When we now read, in the last report from the Department, that the area of wheat in Kansas has increased about thirty-five per cent., (we quote from memory), and that the average of quality, as reported in June, was five per cent. above last year, we have reason to believe that the estimate was a very low one. Kansas has been favored by timely and abundant rains, and, her soil being new, rich and fertile,

we do not wonder at the generous returns made to the husbandman for his toil.

Abilene is the great *entrepot* for the shipping eastward of Texas cattle. Those who claim to be posted gave the number of bullocks feeding near this point in thousands so large that we dare not repeat it. We saw but few near the railroad, as was to be expected; and just here comes in a point upon which we want light and information, and we hope any one, and every one, who reads this paragraph, and has experience, will give it—even those who live near the south-western border of Missouri, and who hope to, or do now, ship their stock by the South Pacific, or, as it is now generally called, the Atlantic and Pacific Railroad. The point is this: Is there an advantage or a necessity—either that the cattle may fatten more, or become better fitted for travel or transportation by rail—that they should be driven to Abilene, or some other point as far north? In other words—will it advantage the cattle and the owners, to drive them to this point because the pasturage is good and the cattle gain every day? We ask for information.

We come now to a very important part of our trip, namely, to the experimental stations of the industrial agent of the Kansas Pacific Road. Mr. Elliott was with us. The train was halted to give us time for inspection, and, we must say, we were most agreeably disappointed. The cereals which had been sown at Wilson's Creek, Ellis and Pond Creek, three stations from eighty to one hundred miles apart, were looking well. The soil is not unlike the prairie soil of Iowa or Missouri; we believe it has the elements of fertility. If hedges can be grown so as to in a measure elevate the wind (which seems to be constantly blowing) and carry it over—if the rain-fall should be increased, either by the travel of the railroad, breaking up of the sod, or the successful cultivation of forests—the time is not far distant when even the so-called great American Desert will become a fruitful field.

Speaking of the cultivation of forest trees, we found Mr. Elliott's efforts giving much better promise than we anticipated, for we will not attempt to conceal our serious doubts of his success. Most of the deciduous trees common to Illinois and Missouri have been planted and are growing; also, some Norway Spruce and American Larch. We do sincerely hope that all will winter well; we should have little fear after that. If Mr. Elliott should employ the rye straw to mulch the trees, even if the grain was scattered and would grow between the rows, we think it would help the wintering of the trees, as that is the most important matter. In the succeeding spring, the rye, if any lived over, could be pulled up, and again used for a mulch. Doubtless Mr. Elliott well understands this fact.

If any of our readers are desirous of seeing some of the rye, wheat and barley grown at these stations, we hope they will visit the

office of the State Board of Agriculture, and it will give us pleasure to show the samples which we know were grown there.

For our experience in and near Denver, we refer our readers to the record of the St. Louis Farmers' Club.

It was in the original plan of the excursionists to have visited Boulder county and the Chicago colony in Colorado; but the necessity laid upon some of them to be in St. Louis at the close of the second week, so far influenced the most of the party as to forego this part of the trip. There is nothing more of interest agriculturally in and near Denver about which to write than what has appeared in the Rural World; therefore, those of its readers who had the patience to follow the writer will please get ready to face to the east. Ten o'clock, P. M., St. Louis time, June 12, is the hour of starting; the evening was very pleasant, and, as the moon had not yet risen, we had a fine chance to view the magnificent pyrotechnic display of our steam chariot, which scattered a perfect shower of golden rain, again and again, and in a dozen places, at once setting fire to the prairie, and, but for the scanty supply of combustible material, the whole world, seemingly, would have been set on fire. At about midnight of the second night we arrived at Manhattan, and took lodgings at the Adams House, the owner of which, Major A. N. Adams, and his pleasant little wife, were part of us. The Major had telegraphed to the landlord to do his best, and certainly everything that could be done was done to make our sojourn comfortable and pleasant.

Our readers will remember that Manhattan is the seat of the Agricultural College of Kansas; and the object of our stop was to visit that institution, then just holding its commencement exercises. Like all similar institutions created by the congressional land grants, this also may be designated as new, and, like some others, it commenced in a building originally erected for some other purpose. As far as we were able to learn, no new buildings at all commensurate with the wants of this institution have, as yet, been erected, and this is perhaps well, because time will be secured to mature the best plans. A good, substantial main structure has now become a necessity, as also a model farm-house for the use of the farm superintendent, and a well-planned barn for the stock. We learn incidentally that the size of the farm to be connected with this institution is to be increased to four hundred acres, which, we think, will be ample. The location is very beautiful, on the high lands about two miles north of the city, overlooking the valleys of the Big Blue and Kaw Rivers, at the confluence of which the city of Manhattan is located. The fields in these rich valleys were arrayed in all their glory, and looked their very best. From a mound in this vicinity we counted forty-nine wheat-fields, which were either being harvested or were ripe for the sickle. Of all the days in the year, this was the most favorable for the party to view the lands, the fields, the crops, etc.

In one respect, the Agricultural College of Manhattan is exceedingly fortunate. Kansas had but three members in Congress at the time the law granting the lands was passed, and consequently received only ninety thousand acres under the act; but so well has this land been selected, located and managed, that about three-fourths of a million of dollars will be aggregated for the endowment fund. But this we know can not be used for building purposes, and we therefore hope that not only the county of Riley, but the State of Kansas, will use such liberality toward this industrial institution as shall place it on a par with similar colleges in other States, and as shall best develop the great interests which will center here. Kansas is preeminently an agricultural State. She has already a very intelligent, enterprising and large population which appreciates education, progress and development; and if her Agricultural College is not in every respect on a par with the best in the land, the people will not be satisfied. But President Denison, with his able corps of professors, understands all this perfectly well, and they are doing all they can to push the institution into position.

We fear the commencement exercises were somewhat interfered with by our visit; if so, it is to be regreted. Here, like in all similar institutions, we find the demand for teachers for district schools, the necessity to improve these opportunities, and the demand also for farm labor on the paternal acres, had decreased the number of students very much for the term just closing. In respect to the students, however, there is no disadvantage by either school teaching or practical labor on the farm: the first is apt to rivet the lesson learned and favor a still better comprehension of the same, and as to the labor part, practice makes perfect. It may necessitate another year's study to some of the students, but will ultimately result in their favor, and also in a greater credit to the institution from which they graduate.

Both sexes are here on an equal footing. In the eyes of some, this is still an experiment of very doubtful success. As far as we could judge, (and this was not our first visit,) it works well at Manhattan. So long as it is written, "It is not good for man to be alone"—so long as boys and girls are reared in the same family with decided advantage to both—so long shall we believe that young men and young women can attend the same institution of learning. Pardon the little side cut we are about to make here. Miss Julia F. Ripley, daughter of Prof. Ripley, at our own Agricultural College at Columbia, received the prize as the best Greek scholar in her class. She takes a full collegiate course, and has the further honor also of being considered one of the three best, in a class of thirty or more, in mathematics.

It may take years, but it will surely come, when scholarship and not sex will determine whether a young person shall be admitted to academic honors or standing.

TO FORT SCOTT.

The excursion party arrived safely, and on time, at Kansas City. Gen. Henning, Superintendent Fort Scott and Gulf Railroad, generously placed an extra palace car on his morning train, and very soon the party were again under way southward to Fort Scott—that city, through its municipal authority, having tendered its hospitality to the Missouri and Kansas State Boards of Agriculture for the present occasion. The Fort Scott and Gulf Railroad passes through the eastern tier of counties of the State of Kansas—to-wit: Johnson, Miami, Linn, Bourbon, Crawford and Cherokee—all of which are among the most fertile and thickly settled counties in that State. And yet there is room for thousands upon thousands of happy homes in this part of the State. Railroads are gridironing the State in every direction, and the cry is constantly for more railroads. If any section of the West (that was) is able to sustain all the railroads now building by abundant freights and local travel, this is the country. We saw many a farm in Johnson and Miami where we thought we could pass the evening of our days in contentment and peace, were we the fortunate owners of the same. Most of the crops we had the opportunity to observe were very fine.

If we take into consideration the great value of a near market—and we do not now mean simply a station at which grain can be sold, but a market like St. Louis or Chicago—then we can not help reminding our readers that the great State of Missouri has many thousand acres of virgin soil, as rich, as fertile, as happily located as any we saw in Kansas, and in close proximity to the North Missouri, Pacific (of Mo.) and other leading railroads, and consequently nearer the St. Louis market.

In conclusion, we can not but express the hope that the tour of observation of both the State Boards referred to, and which we have so imperfectly sketched, will result in cementing closer the ties of friendship of the leaders in matters of agricultural interest in both Missouri and Kansas, and that, by calling attention to the various sections through which we traveled, material and lasting good may result to each and both.

DISCUSSIONS AT ST. LOUIS FAIR.

At the instance of Hon. Arthur B. Barrett, President of St. Louis Agricultural and Mechanical Association, this honorable Board attempted to introduce, as one of the features of the St. Louis Fair, discussion upon various topics of general interest to agriculturists from all sections of this Union. The attempt proved a signal failure. Men intent upon sight-seeing and pleasure can not be expected to forego both, in order to discuss cattle, sheep, swine, bees and grass, all of which claim their attention every day of the year. To witness an "agricultural horse-trot" affords more enjoyment than to discuss

the dry detail of farm economy, (?) though this be the business to which they devote their life and their dollars.

MANUFACTURES AS CONNECTED WITH AND BENEFITING AGRICULTURE,

was one of the topics suggested for discussion during the fair. The Corresponding Secretary offers the following paper upon this subject, which has been read before the Board and ordered printed:

MANUFACTURES AS CONNECTED WITH AND BENEFITING AGRICULTURE.

In all the range of subjects proposed for essays and discussions by the State Board of Agriculture, there is none of such vital importance, and so far-reaching, when traced through all the ramifications of trade and commerce, as the one which heads this paper.

It is perhaps not to be expected that in a paper of limited length, as this must necessarily be, it will be possible for an essayist to trace to their utmost limits all, or even the larger portion, of manufactures, connected with and benefiting agriculture; I shall confine myself, therefore, to the largest interests, and such as are more directly connected with the agriculture of Missouri.

MILLING.

The nearest market which the farmer can reach, where there is active competition for his produce, and at the same time the largest number of consumers, is generally the best, because it will save much time, wastage and commissions, necessarily incurred by hauling to distant markets. The farmer who lives near a town or city where flour is manufactured, for export as well as for home consumption, will realize more net profit from his wheat than he who is obliged to carry or send a hundred miles to market, with all the drawbacks just enumerated. Wheat, augmented by corn and perhaps buckwheat, furnishes "the staff of life," which is needed in every family every day of the year; it also forms a staple product on almost every farm, and, in the compact form of flour, a leading article of export, amounting to five thousand barrels for every day in the year from the city of St. Louis alone; consequently I am justified in placing milling at the head of the list. And in this connection I may be allowed the further remark, that wherever possible to save shorts, bran and mill-feed to be consumed by the farmer's own animals, such opportunity ought at all times to be embraced, because they contain the phosphates, etc., which are very much needed to form both bone and muscle.

WOOLENS.

Next in importance to the farmer, I would name the manufacture of woolen goods. No well-conducted farm should be without its flock of sheep, whether they are kept as a specialty, or only incidentally.

From an economic stand-point, it will not be difficult to prove that no other live stock is so profitable as sheep. When well kept, sheep will pay a hundred per cent. on the investment. We have the word of several Missouri wool-growers, that on the cheap lands of the State wool can be produced at a profit for twenty-five cents per pound; and even less, when the depredations of dogs can be controlled. A flock of sheep, consisting, say of eighty ewes, nineteen wethers, and a buck or two, will, when well kept and tended, double their number every year, and produce at least four hundred pounds of wool. Missouri, in common with her Western sister States, has been and still is in the habit of selling most of her wool to the agents or correspondents of Eastern manufacturers, who usually pay the lowest possible price, and who, by simply assorting and grading wool, are making large profits. For instance, the wool of twenty or more flocks is bought by a house, whose Eastern correspondents manufacture satinets, requiring a medium low grade of wool. Now this firm will buy all the half and three-quarter blood (merino) wool at the price which they have fixed for wools suitable for satinets. They then assort such as are fit for cassimere or broadcloth, or delaines or combing wools, which they in turn sell to the manufacturers of these goods, and always at a profit, because they are intrinsically worth more. Besides, they have this advantage over the farmer in making sales: they know just on what market to place these wools; and the utmost farthing they are worth.

The last few years have demonstrated the fact that the great North-West can build and operate with skilled laborers all the woolen factories needed, and that all the woolen goods needed, and of a superior quality, too, can be manufactured right here—even all that may be required in the mountain territories, on the Pacific slope, and in the South. The old process of sending the wool East, together with the bread and meat to support the operatives, who make it into the various mill fabrics, and subsequently into clothing, or who send it back to us in the shape of cloth, cassimere, satinet, delaines, etc., etc., has always been to us a very expensive one, because we had to bear the expenses of transportation, commission, insurance, etc. How long will we be tributary to the East for the commodities we can and ought to manufacture at home? It is not now profitable to card and spin wool by hand, to have the cloth fulled at the mill, and the clothing all made by hand; such was the slow and laborious process of our fathers. At present this is all done by improved machinery, and much of it better than it could be done by hand. Encouragement should therefore be given by every community for the establishment of woolen mills. The beautiful colors and superior texture of ladies' shawls, made by Lacon (Illinois) Woolen Mills, or the heavy double milled and elegant cassimeres, made and exhibited by Missouri Woolen Mill Company, St. Charles, Mo., Field Brothers, agents, or the soft yet fine and heavy blankets, made and exhibited also by Missouri Woolen Mill Company, St. Charles, Mo., at the late fair of St. Louis,

are *bona fide* proof and ocular demonstration of the enterprise, skill and industry of Western manufacturers. Let Western merchants but be true to the West, by introducing and dealing in goods manufactured in their section, especially if they are as fine, as well made, of as pleasing patterns, as imported ones, and the money annually sent East for such goods will be paid to Western employers, and again in turn to Western workmen, who in turn will purchase Western flour, meat and family supplies, produced by Western farmers; who will help build and populate our cities, and help pay our taxes. Indeed, it were wisdom for many of the Eastern manufacturers to come West, improve our water-power, or build steam mills and locate at the heart and seat of empire.

LEATHER, BOOTS, SHOES, HARNESS, ETC.

The tanners and curriers of the East still cling to and reiterate the idea that leather manufactured at the West has not the quality and strength of such as is made by them in their section. There may be some truth in the assertion, but not for the reason assigned by them, namely: That we have not the tannin. The reason, I think, is found in the process of tanning generally adopted here, which, in contra-distinction from the old and slow, may be termed the new and quick, the *modus operandi* of which it is not my province to explain, were I able. Eastern buyers or correspondents purchase the hides of all the slaughtered stock of farm, town and city. They dress them, manufacture them into boots and shoes, or send them back in the shape of leather—Western consumers footing the expense account, very much after the fashion of the wool account just enumerated. But the bark of some of our trees, and especially of the sumach, (which latter would pay for cultivation for this purpose,) furnishes as good tannin as trees of Eastern growth. Besides, much tannin is at present brought to the West in its extract or liquid state, and, if this is necessary, it will be cheaper to import the tannin than to send the hides to the East.

One can form some idea of the magnitude of the trade in boots and shoes of Eastern manufacture by marking the number of firms of dealers, wholesale and retail, on Main and also on Fourth street, in the city of St. Louis alone. Of course, dealers of many other points in the West are also direct importers. The leather needed for custom work of boots and shoes, as well as harness, must also be taken into account. Being convinced that we have as good workmen of the trade under consideration as there are anywhere in the civilized world, the question arises, why do we not manfacture more boots and shoes? Why not multiply our tanneries?

COTTON GOODS.

The interests involved in the various manufactures made from cotton are enormous. Quite a number of articles of the every-day

wear of every man, woman or child are made from this fiber. Old England for one or more centuries has held out the idea that the world, especially the New World, ought to let her do the manufacturing for the world because she has the capital, the labor, the machinery and the skill, and she in turn would purchase the agricultural products needed for the sustenance of her teeming population, or, at least, *so much of it as she can not produce herself.* We still pay England about $15,000,000 annually for cotton thread. This lesson has been well improved by New England, which proposes to do the manufacturing, if not for the world, at least for America. Why the West, producing part of the staple and being in the natural channel of trade, and nearer to the South, where most of the cotton is grown, should not manufacture all the cotton goods she needs, is the question I would raise. At present only jeans, domestics, batting and seamless bags are the principal fabrics made from cotton at the South or in the West. As in the other, so in this case, Eastern men argue that we have not the machinery nor the skilled labor to manufacture fine goods from cotton. They used to add capital also, (and perhaps they do yet,) but I think this a mistake. Admitting that we have the capital, can we not command all the balance? What is to hinder?

AGRICULTURAL IMPLEMENTS.

It is very gratifying indeed to instance and dwell upon the very important and extraordinary improvements made within the last few years in the manufacture of labor-saving farm implements. In this particular field of manufactures, the West may be said to be in advance of the East. The physical character of Western lands is such that they are much better adapted to the use of labor-saving machinery than those of the Eastern sections of this Union, which are often broken, hilly, and even mountainous. It is claimed, also, that the Western mind is more practical and direct in its workings; but if this is true, it is also certain that it does not generally take an Eastern man many years to become Westernized; hence, when Eastern manufacturers come West and behold the great extent and beauty of our table lands and prairies, they catch the contagion, and either come West to manufacture their machinery, or, manufacturing in the East, become the active competitors of Western manufacturers; all of which works in the interest of the farmer-consumer. To enumerate all the advantages accruing to the farmer from the inventions and manufactures of labor-saving implements would be to write a book—a task for which I am not at present prepared.

The establishment in a community of a reaper or plow factory, or of the hundred and one other tools used and needed on a farm, is a public blessing, which in its beneficial results permeates the whole community. Hence, all possible encouragement should be given to secure the location of such enterprises. Some of our young cities

seem to fully comprehend this proposition, and are acting from broad and comprehensive views; for instance, Atchison proposes, at this present writing, to vote $40,000 subsidies, to be divided between manufactories, foundries, etc., etc. But there is plenty of room for similar transactions, especially in Central and Western Missouri.

The cost of transportation on heavy farm machinery is no small item, and the nearer the maker and the farmer can come together, the less the cost, which generally comes out of the pockets of the consumer. Besides, Missouri has within her own borders the principal raw materials needed in the manufacture of agricultural implements, such as iron, wood, coal, asbestos, etc.

HIGHWINES AND MALT LIQUORS.

Alcohol is sometimes used as a medicine, sometimes as the base or preserving agent of other medicines, or in the preserving of animal or vegetable matter. The amount needed for medicinal purposes would be but a tithe of that actually manufactured. The actual amount consumed, of corn, rye, barley and wheat, in the manufacture of highwines and malt liquors, is very large. By this peculiar process of manufacture the elements of health-giving and life-sustaining food are changed, according to our best physicians and analytic chemists, into poison, which the human system can not and does not assimilate.

But it not being the present purpose of the writer to offer a temperance lecture, nor yet to sit in judgment on any man's conscience, the simple advertence here to the fact that much grain is used in the manufacture of the articles under consideration, and the employment thereby afforded to many men, will be sufficient.

THE PICKLING AND PRESERVING OF FRUITS AND VEGETABLES.

As far as the West is concerned, this branch of industry is still in its infancy, and yet, with the rapidly increasing population, and the consequently increased demand for the articles which head this paragraph, there is no good reason why a very profitable trade in them should not be established. Why should we be tributary to England, for instance, for onion pickles? Yet such is the fact. Northern Illinois, Iowa and Minnesota can produce as fine onions, or any of the other vegetables commonly pickled, as England. Why should the Oneida Community, who have made the canning and preserving of fruits a specialty, find their best market in the West? Missouri and her Western sisters can grow as delicious fruits and vegetables as New York, or any other Eastern State. Not only should every farm or village household be well supplied by "home-made" pickles, preserves and canned fruit, but all that are consumed in our larger cities should be grown and "put up" in the West.

The writer is pleased to be able, in this connection, to notice the establishment of preserving factories at De Soto, in Jefferson county, and at Sedalia, in Pettis county, Missouri. There may be others, and there is room for more. Let them be patronized by Missourians and Western dealers generally.

LINSEED AND CASTOR OILS.

It would be a great oversight, indeed, not to enumerate the manufacture of the oils just named. The growing of flax for seed, and the castor bean for the oil contained in each, should receive more attention from the farmers than they now do. In a climate so well adapted to their production as that of Missouri, their skillful cultivation can not but be profitable. But it is difficult sometimes to get men out of the old ruts. It is wheat, corn, oats, beef and pork, with most of them, unless some extraordinary success, like that which happened to the hop growers of Kilburn City, Wisconsin, appeals directly to their pockets, and then they all rush pell-mell, without forethought or reflection, into the new business, which promises such generous returns, and which they leave as suddenly, richer in experience, but poorer in purse. To those, however, who possess rich lands—the soils adapted to the cultivation of linseed or the castor bean—who are willing to study the detail of the business, success is as certain as in the growing of wheat or corn. The demand for flax-seed and castor beans is constant. Not unfrequently, the manufacturers of these oils have to advance the seed and promise to take the crop at a certain minimum rate, agreeing to pay any advance of the market, in order to induce farmers to cultivate flax or castor beans. This, alone, is indicative of a sure and constant market, and but little fluctuation in the price.

HEMP AND FLAX FOR FIBER AND SEED.

There is a constant and growing demand for these fibers. Very many articles in daily and general use, such as matting, rope, twine and cordage of various kinds, are made from either, but principally from hemp. The manufacture of linen from flax, in the United States, is very limited. When flax is raised for the seed, the fiber, just as it is run through a common threshing machine, finds a ready market at the paper mills. On rich and productive lands, the cultivation of hemp and flax for the fiber is very profitable. Hemp-seed is also used in considerable quantities as bird-feed.

BROOM-CORN.

The fibers of the head of this species of sorghum are used in the manufacture of our common brooms. Broom-corn will grow on any soil which will produce the common field corn. It requires some experience to rightly manipulate it, and prepare it for the broom-

maker. From the fact that this class of brooms are in use in every household, and that they soon wear out, their manufacture must be quite extensive, and give employment to many people. But the production of broom-corn, and its sale at very high prices, seem to be as uncertain as the hop crop of Wisconsin already referred to.

In this connection I have seen fit here to introduce a short article from A. H. Rice, of Indiana, on the cultivation of broom-corn:

"In the first place, alluvial or river bottoms are the best soils for broom-corn; sandy loams or black ground will also produce a good quality, but clayey soils never. The next thing of importance is that the soil should be well stirred—we go in for deep plowing—and the soil should be finely pulverized, just at the time you wish to plant, so as to give the corn a chance to get ahead of the weeds.

"Broom-corn makes a very slow growth at first, and it is very important to keep it clean of weeds to insure a good crop.

"It should be planted as early in May as the weather and condition of soil will admit, say from the 1st to the 15th. We prefer drilling, as it is quicker done, and as it gives a more even quality of brush, and generally a better yield. If you have not a regular broom-corn drill, a wheat drill will answer the purpose, by removing all the hoes, except two or three, (as the distance may be,) so as to make the rows about three feet apart. The drill should be arranged to drop seed to stand, when growing, from fifteen to twenty-five stalks to every three feet.

"The crop will probably be ripe enough to commence cutting by the middle of August or 1st of September.

"Should you have a number of acres, it would be best to commence cutting as soon as the seed is in the milk. The important thing is to cut and cure it green, as such commands much the highest price in the market. It should be hauled as fast as cut, (or at least the same day,) directly to the scraper. After the seed is removed, the brush should be spread upon sticks, or poles, in the shed to dry. The shed should be arranged with doors or windows, by hanging every second or third on hinges, to give plenty of air.

"The sticks we use in our sheds to lay our corn upon are sawed two inches square and ten feet long. These we place on ties, eight or ten inches apart. Commencing with the lower tier, we spread the brush from three to four inches thick; then, directly above, another tier, and so on, until all are filled. When the brush is sufficiently cured, it is baled and ready for market.

"We do not consider broom-corn more injurious to land than other corn. We have raised it repeatedly on the same ground.

"We think the Missouri green the best kind, (and raise no other,) as it yields well, and the brush is fine, and sells best in the market."

SIRUP, VINEGAR AND WINE.

Considerable quantities of sirup are made from sorghum and imphee. Vinegar is made from cider, and cider from apples, and that so produced is claimed to be the most wholesome. Wine is made from grapes, and the best of all vinegar from wine. All these are leading articles of commerce. Their production and manufacture give employment to thousands.

BRUSHES, BUTTONS, BONE-BLACK AND COMMERCIAL MANURES.

The manufacture of brushes, brooms, etc., from the hair and bristles of swine, the manufacture of buttons from the bones of oxen and swine, the bone-black and blood used in the refining of sugar, and the manufacture of commercial manures, are intimately connected with agriculture, as every one will readily conceive.

"Commercial or special manures are fertilizers not derived from the ordinary sources of the farm; that is, from the stable or the compost heap. The principal commercial manures are the guanos, bones, wool-waste, hair, woolen rags and the oil cakes; artificial manures are bone-meal and flour superphosphate of lime, muriate of lime, soda-ash, sulphates and nitrates of potash, soda and ammonia, and various poudrettes. Most of these manures, as they are received from the manufactories, need little or no preparation, but are ready to be applied directly to the soil, or to be composted with other manures, or to be dissolved for use in a liquid form."—(See Agricultural Report 1865, page 378.)

TOBACCO.

The culture of tobacco, as well as the manufacture of the various guises it receives, of cigars, fine-cut, plug, etc., under which it is known in commerce, must not be overlooked. It may be classed as one of the staples of Missouri. However much we may deprecate a perverted taste which craves its narcotic influence, we here deal with the fact that it is an article of commerce, and that its cultivation and manufacture give employment to many.

BUTTER, CHEESE AND CONDENSED MILK

I would mention as manufactures by farmers rather than in the interests of agriculture, though they undoubtedly form a very lucrative branch of farming.

The writer is well aware that not nearly all the manufactures connected with agriculture have been enumerated, yet the leading articles have been introduced.

In order to show, at a glance, the various steps and removes between the product of the farm and its ultimate use, as well as the

indirect manufactures benefited thereby, the following enumerations are yet added:

Wheat—Mills, flour, bread, crackers, starch, mill-feed, straw, paper, straw hats, bags, boxes, barrels, etc.
Corn—Meal, bread, hominy, starch, highwines, glassware, boxes, barrels, bags, etc.
Buckwheat—Meal, bread, paper bags, bags and cooperage.
Barley—Pearl barley, malt, beer, whisky, vinegar, bags and cooperage.
Oats—Meal, bags, etc.
Rye—Flour, meal, bread, highwines, bags, paper, straw hats, cooperage.
Cattle—Beef, butter, cheese, condensed milk, leather, boots, shoes, harness, trunks, glue, soap, candles, curled hair, mattresses, bones, buttons, combs, bone-black, commercial manures, cooperage, etc.
Sheep—Mutton, leather, wool, cloth, cassimeres, carpets, blankets, shawls, hose, socks, yarns, etc.
Swine—Pork, lard, lard-oil, candles, glycerine, cooperage, brushes, brooms, buttons, plastering hair, etc.
Cotton—Domestics, prints, yarns, jeans, socks, hose, batting, canvas, paper, thread, etc.
Flax-seed—Oils, paints, medicine, lubricating oil, harness oil, glassware, cooperage, cordage, paper, etc.
Castor Beans—Oil, medicine, harness oil, glassware, cooperage, etc.
Hemp—Rope, cordage, matting, bird-feed, etc.
Tobacco—Leaf, plug, fine-cut, honey-dew, snuff, cigars, medicine, sheep-wash, anti-insect soap, boxes, cooperage.
Agricultural Implements—Reapers, mowers, wagons, steam-boilers, corn-crushers, corn-planters, cultivators, harrows, plows, locomotives, cars of all kinds, etc.
Pickling and Preserving Fruits and Vegetables—Cans, glassware, etc.
Broom-corn—Brooms, brushes, and feed for stock.
Sorghum—Sirup, sugar, vinegar, cooperage, etc.
Apples—Cider, vinegar, cooperage.
Grapes—Wine, vinegar, glassware, cooperage, etc.

IMMIGRATION.

The answers received with regard to immigration—one of the questions proposed in a circular sent out by the Corresponding Secretary, and approved by the President of the Board—have induced the former to prepare a paper upon that very interesting subject, which is at the service of the Board.

CORRESPONDENCE.

The correspondence of the office, during the year, has been large and interesting, and is greatly on the increase. The reports of the Missouri State Board of Agriculture have been distributed more widely outside of the State, and more generally within Missouri, than ever before, as a reference to the Secretary's record will show. Any information with regard to the resources of Missouri, sought at this office, either by letter or by word of mouth, has been cheerfully communicated to the full extent of my ability. "The visitors' register," found on the Secretary's table, reveals only partially the names of persons visiting the rooms of the Board.

COMPETITION FOR THE PREMIUMS

Offered by this Board, except for the best vineyard, has not been large. The reports of the respective committees are herewith respectfully submitted.

THE CIRCULAR,

Approved by the President of the Board, and sent out by the Secretary, has met with pretty general response. The answers thereto, together with the county reports, deserve a careful perusal, containing, as they do, valuable information regarding the status of agriculture in the various sections of this great commonwealth.

In conclusion, allow me to remark that the railroads of our State are very much engaged in completing the net-work of iron and steel which will very soon give the citizens of every county closer, more intimate and speedier communication with the outside world, give more remunerative prices for all the products of our State, and hasten the time when Missouri will be the Empire State, and St. Louis the capital, of the nation.

ESSAYS.

THE HONEY-BEE—WILL IT PAY?

BY L. C. WAITE, ST. LOUIS, MO.

Having been assigned the duty of discussing the above subject, I ask your attention while I present, in as few words as possible, my humble ideas in regard to this question.

The question of profit has become, in this nineteenth century, the all-absorbing one. It enters into the most ordinary affairs of life. In the shop, the idea is, how to make the greatest profit from the smallest amount of labor and material. In commerce, the main question is, where shall we find the greatest return for the capital that has freighted our steamers, our ships, our railroads? Even the sturdy farmer, who, a few years ago, produced what he could and was content with whatever might be netted him, now looks at the question of labor and production, and coolly asks, will it pay? And now the question has been applied to the keeping of these wondrous little insects, whose habits, only a few years ago, were a marvel and a mystery to most men, and people begin to wish to be enlightened into the possibility of making wealth out of their industrious habits.

Strike from the nature of man the desire for gain, and you strike at the very root of all their mighty works going on in this great world of ours. The vessels whose white sails now dot the mighty ocean would lie rotting at their docks. The hum of the ponderous machinery now heard through the length and breadth of our land would cease. The puff of the fleet-gliding steamer along our rivers, and the rattle of the flying cars along our many miles of railroad, would be heard no more; and the world would present a scene of inactivity and silent gloom fearful to contemplate. Profit is the mainspring that holds in place and keeps in motion the machinery of the world. It is the mainspring of all our actions. Hence, it is no wonder that people are daily asking the question, will the honey-bee pay?

and it is our duty to-day to discuss that question before you, presenting facts for your consideration that will bear the light of investigation, and allow you to follow us to the conclusion arrived at. And here let me say, that the mere keeping of bees, without care and watching, or leaving them to themselves, *will not pay.*

As to whether bees, properly kept, closely watched and attentively cared for—kept with a view to turn them to account, and on which proper care and management have been bestowed—will pay, follow us through a few statistics, and we think we will be able to demonstrate to you the fact that they will, beyond peradventure.

In compliance with a request from Hon. Horace Capron, late Commissioner of Agriculture, Mr. Adam Grimm, of Jefferson, Wis., under date of January 12, 1871, says that, during the season of 1870, his yield of honey was 22,725 pounds, which amount would have been doubled, had his stocks been in good condition in the spring. He realized $3,180 net for the honey which had been sold, leaving on hand and unsold 5,015 pounds, which would bring, after deducting expenses, about fifteen cents per pound, or about $750. For Italian queens and colonies of bees, he took in, during the same period, the snug little sum of $1,151. He also says that in consequence of the total failure of the honey harvest of the season of 1868, *the only one he experienced in twenty years*, he wintered only 600 colonies, out of 670; which, in my opinion, proves that the honey harvest can be relied on, in the long run, as well as any other crop. Mr. Grimm is posted in regard to the "goings on" of the "little prick-tailed insects," which explains why he most always, as a general thing, comes out at the larger end of the horn.

Mr. M. Quinby, of New York, the pioneer of bee-keeping in this country, in a paper read before the North-Eastern Bee-keepers' Association, at its last meeting, says that a young friend of his, who would vouch for what he (Quinby) said, obtained, in 1870, from 300 stands of bees, 25,000 pounds of the best quality of box-honey, which sold for a price averaging nearly thirty cents, amounting to over $7,000.

Here is what five different persons report in last month's "Bee-Keepers' Journal," published at New York, by H. A. King & Co.

Mr. W. H. Watkins, of Henry county, Iowa, says he has kept bees for the last three years, and found them more profitable than any other stock on the farm. He gives figures which show that in 1869, his total expenditures amounted to $140, and total receipts to $440, leaving a clear profit of $300 the first year, or over 300 per cent. on the capital invested.

Mr. D. Bare, of Hubbleton, Wis., reports that in 1870, he obtained 850 pounds of surplus honey from twenty stocks, and increased them to thirty-nine stocks. Capital invested, $250; receipts, $400.

Mr. C. R. Isham, of Livingston county, N. Y., says that from his apiary of less than fifty stocks, he obtained, in 1870, over 2,600 pounds

of good box-honey, leaving an abundance of stores in the hives for the bees to winter on.

Mr. James Bray, also of New York, reports that in April, 1870, he bought four stocks of bees for $25, and obtained from all of them honey which sold for $150—increasing the four stocks to sixteen.

Mr. J. W. Hosmer, an eminent apiarian of Minnesota, puts in his say for this season, which is, that he had taken out over six tons of honey from 150 stocks since first of July, 1871, which, at twenty-five cents per pound, would bring $3,000—a very nice income.

Mr. Joseph H. Gisler, of St. Louis county, Mo., gave me authority to say that he had kept bees for the last six years, and found that they paid. His yield of honey averaged him about 7,000 pounds annually, which he dished out every Saturday at Union Market, St. Louis, at an average price of thirty cents per pound.

I might go on and recite facts like these for a week. The Bee Journals and Agricultural press have been full of such instances for the last three or four years. Bees that are allowed to keep themselves, of course, can not be expected to pay; as well might corn be made to pay by simply planting it. A great many people purchase costly, complicated, humbug, patented bee-hives, paying a good price for using the same; also, to have their bees, comb and all, transferred from better hives, perhaps, into them. They then think they are on the road to fortune, and, finding out their mistake, go prating around that movable comb hives are a humbug, and that keeping bees don't pay, when, in fact, they allowed their industrious little friends to do all the keeping themselves, amid many dangers that surround them.

There are a great many men, who, in order to sell hives and rights, will transfer bees whether in or out of season; in the majority of the cases the job is done out of season, thereby running great risk in losing the bees transferred.

There are hundreds of patent bee-hives, and their name is legion, the majority of which are not fit to put bees into. Two or three patents on bee-hives are taken out almost every week, and still they come! From the way the thing is managed now-a-days, I guess it is not a very difficult job to procure a patent on anything resembling a bee-hive. If I wanted to, and had money enough to pay the fiddler, I could pitch in and get a patent every week for a year, and not half try. Things have come to such a pass that I doubt if bees can be kept in a woman's petticoat without paying royalty to some *great genius*.

There is no doubt in my mind but that the majority of the patent hive venders have done more harm to bee-culture than they have done good, and that is putting it very mild. There are a few good patented bee-hives, and I believe the "laborer is worthy of his hire;" therefore I go in for giving the devil his due.

I have presented the question to you as it strikes my mind, and I think I have shown that bee-keeping will pay; in other words, that

there is enough of profit in it to suit even the most ardent lover of greenbacks. To those of you who have kept back from engaging in bee-culture, on account of doubts as to its profit, I say, join the good cause. If you go into the work in earnest, you will certainly reap a plentiful reward.

BLUE-GRASS.

BY O. H. P. LEAR, HANNIBAL, MO.

I have made somewhat extensive research to find the origin of blue-grass, without success. I wrote to the Department of Agriculture at Washington, and obtained nothing definite.

The Commissioner of Agriculture, Mr. Watts, says that many authorities declare it indigenous; others say that it was brought from England by some family who accompanied Daniel Boone to Boonesborough, in the first settlement of Kentucky.

Samuel D. Martin, of Clark county, Kentucky, writes to the Commissioner of Patents in 1855, and says that the seed of blue-grass (*Poa pratensis*) was brought from England to Boonesborough and planted in a garden, but gives no authority for its origin. It became troublesome, and was dug up and thrown over the fence. But it could not be so easily rooted up, and in time spread over the State, and particularly in the following counties: Fayette, Woodford, Scott, Bourbon, Clark and Franklin. This region embraces the famous blue-grass region of Kentucky, that has a world-wide reputation, and is truly the home of blue-grass. It forms a fine thick sod, affords much grazing, and keeps green all winter. As a pasture grass it is not excelled by any grass that grows, especially for the Great West, notwithstanding botanists have described over three thousand varieties.

"All flesh is grass," says inspiration, (in a concentrated form;) says a very eminent French writer, it is but another term for beef and mutton, shoes and clothing. A well-known farmer of Kentucky says that it is one of the most valuable crops, especially on rich limestone land. On thin land and a dry season, it will dry up in July and August; but if not pastured down early in the season, stock will eat it in the cured or dried state, and thrive on it, and after August it takes a fresh growth and makes fine winter pasture; and the farmer who has fine blue-grass has the basis of all agricultural prosperity; if he does not bear off the premiums at our State and district fairs on.

his Short-horns and Devons, Cotswold and Southdowns, he has no one to blame but himself; says Flint, "he can hardly avoid doing well if he will try."

Mr. Martin, above quoted, says that he received a small package of grass seed from Virginia that produced a grass that grew in bunches like orchard grass, (we have a variety of grass in North Missouri, called by many of our best farmers Virginia Blue-grass,) and describes it as growing in bunches, and continuing to grow all the season, but not so luxuriant as the blue-grass proper, but thinks it much richer in nutritive properties and much harder to kill out; this is the *Poa compressa*. I think that this grass is Mr. Martin's Virginia grass.

Flint, in his work on grasses, says that many farmers place too high a value on blue-grass without a fair comparison with other grasses, and then adds, that many English farmers will not give it ground room, and also, that it does not do as well in New England as some other grasses.

Flint also leaves us in the dark as to its origin, but he gives us some tables showing the relative value blue-grass (he calls it green meadow-grass, June grass, spear-grass, Kentucky blue-grass, etc.,) has to timothy, clover and other grasses, by Professor Way, which, if no allowance is made for climate and soil in the different locations, shows that blue-grass is lacking in the ingredients necessary to form muscle and fat.

In the above table we find that timothy, (which I will compare with blue-grass, from the fact that the Mississippi Valley is the home of both these grasses,) in every 100 parts, dried at 212° Fahrenheit, contains, of albuminous or flesh-forming principles, 11.36; of fatty matter, 3.55; of heat-producing principle, such as sugar, starch and gum, 53.35; woody matter, 26.46; ash, 5.28.

In blue-grass, in the dry table of albuminous or flesh-producing principle, we find 10.35; fatty matter, 2.63; heat-producing, 43.06; woody fiber, 38.02; ash, 5.94.

Now if this table will hold true here, we find that timothy, pound for pound, is worth more to the farmer than blue-grass; and this statement is verified in the experience of one of Marion county's largest cattle feeders, with twenty-five years' experience. He contends that timothy and clover mixed are worth very considerably more than blue-grass, especially for grazing during spring and summer months. For late fall and winter pasturing, blue-grass, well set, is very valuable. The experience of our best grazers is, that grass grown in the shade of trees and brush is not worth over half as much as that grown on open land. Many of our farmers are losing annually by pasturing their grass too closely, as well as by turning stock on it before it gets well set. I know some farmers who have been twenty-five years trying to get blue-grass to grow in timbered land, with the under-growth cut out, but the sprouts out-grow the grass every year, and they are taxed annually half enough to grub their land clean at once; but

even then we find that such pastures, shaded by large timber, are not worth half what open land is in pastures. Such is the experience of our best cattle feeders in Marion and adjacent counties in Missouri, as well as many Kentuckians, who have given their experience in our agricultural reports and otherwise.

The time is not far distant when we will have these analyses made at home in our own Agricultural College, which is the only correct way to ascertain the true value of grasses, as well as any product of the farm that is used for stock-feeding purposes. I have received a communication from Col. John Nichols, of Marion county, who is one of the oldest and most successful farmers in North-east Missouri. He has been experimenting with blue-grass for over thirty years. He says that the seed should be sowed in August, at the rate of four pounds per acre, of clean seed, on well-prepared land, and that it should not be pastured until well set or sodded, and further, that stock should not be turned on it to graze before the middle of May, and should be turned off by July, and let it grow for winter-pasture; thus treated, that it is of more value than clover to the farmer. He further says that it is economy to prepare timbered land, after clearing out the under-growth, to pasture with sheep for three years very closely, or until the land is bare of vegetation, and the leaves and limbs of the sprouts are all eaten off, until the first of July. Then put the sheep on good pasture to recruit by cold weather. By thus utilizing the labor of sheep, he can kill out the sprouts much cheaper, and also much quicker, than by hand-grubbing. He says that good blue-grass is the cream of all grasses, and is worth four dollars per acre annually; that is does not impoverish the land, but on the other hand will improve it by the droppings of stock and the decomposing of its fibrous roots; horses, mules and sheep do well on it, when well grown, during winter, if the snow does not get deeper than five or six inches.

I find Gray says in his "Field-Book of Botany," that *Poa* (grass) *pratensis* (meadow) in the West is called Kentucky Blue-grass. *Poa pratensis* means "*Meadow Grass*" in all botanical works, and is beyond all doubt the *true Kentucky Blue-grass*.

ITS ORIGIN,

over which so much mystery has been thrown by many writers, is cleared up by the following, from a work published in England in 1787, "Miller's Gardeners' and Botanists' Dictionary," published in four volumes folio. It is there stated that it is a native of England, and has for centuries been regarded as one of the most valuable pasturage grasses, and that it either was a native or was naturalized in America.

Dr. Witherington is quoted as follows in the above work: "This grass constitutes a considerable part of the herbage in the rich meadows in the flat parts of Somersetshire." The same work also

quotes from Mr. Swain, an eminent author, as follows: "In the meadows, which have been flooded all winter, it flourished so as to almost exclude all other grasses."

This Dictionary, with all its array of eminent authors, proves conclusively that *Poa pratensis* is one of the most *nutritious* as well as the *best* pasture grass known in England.

Prof. Tice says that he saw in the mountains of Colorado no less than three kinds of *Poa*, namely, *Andeiro*, *Serotina*, and *Alphia*.

There are certainly two of the blue-grass varieties here, undistinguishable to any but practical botanists, as it is not decided which is the most valuable, the *Poa pratensis* or the *Poa compressa*. The importance of this grass is of so much moment to the Missouri farmer and grazer, that there should be no time lost in having this subject so well *ventilated* that every man, woman and child, in the rural districts, shall be able to distinguish them at once.

Will the Professor of Agriculture enlighten us in some *plain*, *practical way*, that we may not be mistaken?

My own experience and observation is, that farmers do not sufficiently appreciate blue-grass pasture, from the fact that many of the oldest and most independent farmers never owned a blue-grass pasture in its true meaning. They very rarely sow in land that has been cleared up or plowed, and *none* of *them* sow seeds enough to make a crop, without waiting sometimes for years *for it to take*. The rule is to sow in the woods, or I might say, the rule is (except among the first-class farmers) not to sow the seed at all, from the fact, in all North-east Missouri it is spreading over the commons; you could scarcely find forty or eighty acres unfenced land, but along the *road-sides* and cow-paths you can find it stealing its way (struggling for dear life) among the brush and timber, showing clearly what it would do, if it had a "*chance*." In oak and hickory land it is much harder to subdue the sprouts than in walnut and elm lands. In the prairies it is much easier to make a well-set pasture than in the timber; but even there, they wait for it to take of its own strength. The next drawback is, the general practice of turning in too early, in spring. Col. Nichols says that "the stock travel all day to sustain life," thus wearing out the flesh, as well as treading on so much more of the surface than they have to do when put on at a time that they can get a full bite; then they can fill themselves, without going over all the pasture every day, and lie down to rest, gain flesh, and let the grass grow, too.

THE CATTLE OF THE LOWLANDS,

ON THE SOUTHERN BORDER OF THE GERMAN OCEAN, WEST OF THE MOUTH OF THE RIVER WESER.

BY DR. H. J. DETMERS,
Lecturer on Veterinary Science in the Kansas State Agricultural College, at Manhattan, Kansas.

Almost all the efforts to improve our breeds of cattle have been directed toward making them better flesh and fat-producing animals, and, indeed, these efforts have been admirably successful. Several breeds of animals have been originated and cultivated which can not fail to satisfy the highest demands of the feeder as well as of the butcher and of the consumer. All parts of the animal body which have comparatively little value for the shambles have been reduced to the very smallest size, and all those parts which in cattle give the most valuable meat, have been developed as much as, perhaps, is possible without making the animals into monsters. These breeds, which had their origin and have been brought to perfection almost exclusively in Great Britain, have been bred and raised, not only from different stock—have derived their qualities from different sources—but also in different parts of that country—parts which differ very widely as to their richness of soil, and their physical properties in general; consequently the qualities of all these breeds, cultivated under the influence of those soils and the physical properties of the country, are such as make those breeds particularly adapted only to those countries where the same have been raised and originated, and to those others which are similar in all essentials. So, for instance, as far as the United States of America are concerned, Durhams or Short-horn cattle will thrive best, and excel all other known breeds of beef cattle, on the deep, black and fertile virgin soil of our Western prairies in the Mississippi Valley, while Devons will do far better than Short-horns in a more elevated country with a soil less fertile. Therefore, if we want to cultivate an improved breed of cattle, we must first, and above all, select a breed that is adapted to our soil and the physical conditions of our land; if we fail to do so, then our breeding business will be a serious failure. For the same reasons, the Eastern States in general never will be able

to compete successfully with the Mississippi Valley in the production of Short-horn cattle, on account of the inferiority of their soil, and the too elevated condition of their country; but they possibly may do better in raising smaller breeds of cattle—for instance, in breeding the very active Devons—as for them the soil and country of the Eastern States may be just as good, and may be, in some respects, even better than ours.

Some of the best breeds, at present renowned for their excellent flesh and fat-producing properties, not very long ago were famed and valued on account of their milking qualities; but as the demand always exerts its influence upon the supply, and as good food and good care, such as those famous breeds are used to receive, together with a deep and fertile soil, will and must increase the fattening tendencies and diminish the milking qualities, a great change has taken place, and breeds, originally excellent milkers, have become producers of flesh and fat. Lately, we may say during the last decennium, the demands for the products of the dairy have been steadily increasing, while for the supply of beef new sources have been opened; consequently the demand for cattle that are good at the pail has increased in the same proportion. A great tendency to lay on fat and flesh, and the property of yielding a large quantity of milk, can not well be united in one and the same animal; still less in one and the same breed. Therefore, as our famous beef animals are failing to answer the demands of the dairy, the question is, where and how such a breed of cattle may be obtained, that will give full satisfaction, and will also, besides its milking qualities, give fair beef animals, that is, as far as production of fat and flesh can be found united with a large yield of milk. There are two ways, each of which will lead to success: the one is to import an established dairy breed; the other to originate and develop one out of our native cattle, by the most careful and persevering selection. The former leads to the desired object at once, but requires a good deal of money to start with; the latter is a slow one, does not require much money, but a long time, good judgment and a great deal of patience and perseverance. Which way is to be preferred depends entirely upon our means, our ability and our perseverance. If our means will allow us to import an already established breed, it may be advisable to do so, for we may much sooner gain our point, and have earlier returns for our invested capital. But then another question arises: that is, what breed deserves to be selected, or which one does offer the greatest advantages? That again depends entirely upon circumstances; to decide that point, we have first to take into consideration the quality of our soil, our climate and the physical condition of our land; for among the dairy-breeds there is just as much, and, may be, still more difference in that respect than there is among the breeds raised exclusively for the shambles. Secondly, we have to decide whether we want our animals merely for the production of dairy products, or intend also to raise animals for breeding, with a view of

selling them to others. If we mean to do the latter, and want to make money, we have to find out, and to deliberate, which breed is, and probably will be, the highest in public favor. A great many dairymen have decided in favor of the small Alderney, Jersey or Guernsey cattle, from the islands in the British Channel, near the French coast; and there is not the least objection to that choice, provided their farms, on account of sterility and poor soil, are not able to support a larger breed. To raise and to cultivate that breed on our rich Western prairies in the Mississippi Valley, which are able to support and to develop the largest breeds in the world, would be an economical crime, or to say the least, extravagance and waste, although there is no doubt, that those little, tiny things would improve, and somewhat increase in size, on our deep and fertile prairie soil; they also would become better beef animals, but would lose a great deal of their good milking qualities. Such a small breed may be very satisfactory in some places in the East, and in mountainous and rather sterile countries; but here in the West we want something more substantial.

Ayrshire cattle, at one time, too, had a good reputation as dairy animals, but, like any other small breed that is well kept, or is brought from an elevated region and rather light soil to a flat and more fertile country, that breed also, since it has been cultivated in more fertile districts than its native Ayrshire, has lost, more or less, its value as a dairy breed, and has increased its tendency to fatten, so that at present Ayrshires scarcely can be considered the superiors of Short-horns as far as milking qualities are concerned; they almost may be considered as miniature Short-horns, which are few decenniums behind in perfection. If we should attempt to cultivate and to raise that breed on the deep virgin soil of our Western prairies, the consequence would be that its milking qualities would decrease still more, and in the same degree as its value for the shambles would increase. Therefore, Ayrshires neither can be the choice of our Western dairies, at least not of those located on the rich soil of our prairies. They may be chosen in the West as in the East, but only on such farms as have a soil too shallow or too sandy for the production of large animals.

By selecting a foreign breed, we may always keep in mind that the peculiar properties of all breeds are more or less the products of the peculiarities of the soil, and country in general, in which those breeds have originated, and been cultivated. To raise and to cultivate a large breed, on a sterile or sandy soil, or in a mountainous country, would be an utter impossibility, or, at least, could be accomplished only with great expense, by importing all the food from more fertile districts. Therefore, if we want to make the keeping and the breeding of a foreign breed profitable, we must be able to offer such a breed all those advantages and peculiarities of its native country that have brought the same to what it is, and have developed its superior distinctive qualities. If we can not, then we never can succeed in keeping such a breed up to its standard; it will run down,

in spite of the most judicious selection of the animals for breeding. On the other hand, if we transfer animals which have developed their peculiarities in a sterile or broken country, or on light and sandy soil, to a rich and level or slightly undulating country, with a deep and fertile soil, or feed them heavy food, their peculiar qualities will be changed entirely in a few generations; they will mature earlier, they will grow larger, and their fattening tendency will be considerably increased; but their milking qualities, especially if those animals belong to a dairy breed, will be diminished in the same degree as their capacity to lay up flesh and fat is increasing.

Now, the question is, whether an excellent dairy breed can be found that has originated, and its milking qualities developed, in a country, with a soil equally deep and rich as the virgin soil of our prairies in the Mississippi Valley, and concerning which there is no danger that the luxurious pastures and the heavy food we are able to offer them will interfere with their milking qualities.

On the Southern border of the German ocean or North Sea, west of the mouth of the river Weser, we find a very peculiar country, which extends only a few miles into the interior, and is known by the name of "the Lowlands" or "Marshlands." It embraces the northern part of the grand-duchy of Oldenburg, the northern and the western part of the Prussian (late Hanoverian) province Ostfriesland, (East Frisia,) and the northern and north-western part of the kingdom of Holland. This strip of country is perfectly level, and so low that it has to be protected by high dikes, or dams of earth, against the tide of the ocean, which constantly threatens it with inundation and destruction. The soil in this country is the richest alluvium, a product of the same tide which, if the land was not protected by its dikes, would soon work its destruction. A very ingenious net of small earth-dams, fascines and ditches on the new alluvion, outside of the main dike—that is, on the shore or strand left dry at ebb-time—causes the accumulation of the maritime deposits, and of the deposits of the earthy material or detritus of the rivers, whereby the new alluvion on those flat shores is raised within a few years to the level of the land already protected by dikes; that is, to the level of an ordinary tide. As soon as a large enough piece of land is gained from the sea to pay the expenses, a new dike is constructed for its protection; and so it happens that sometimes a thousand acres or more of those low lands are surrounded by a dike, and that in some places the country is protected toward the sea by two, three or more large earth-dams, one behind the other, and sometimes scarcely a mile apart. This country, like most of alluvial soil, is of extreme fertility; some parts, however, especially such as have been gained entirely from the sea, possess a very mellow soil, and are admirably adapted for the production of cereals; while other parts, especially those near the mouths of the rivers, which have been made up partially from the mud and sediments deposited by the rivers, have a very tough and heavy soil, which,

when dry, is almost as hard as a rock and scarcely can be plowed, and when wet, requires a long time to dry again, and is a good deal like shoemakers' wax; so that in some seasons it proves to be almost unmanageable—at least it would be so to our common American plows and harrows. Therefore, these parts of the Lowlands, notwitstanding that the same abound in fertility, and are producing far greater crops than those with the mellow soil, provided the same have been worked successfully, are chiefly used as pastures, and indeed, afford pastures which, especially for cattle, cannot be excelled in the world—at least not as far as their richness in verdure and the nutritious qualities of their grasses are concerned. Such a country, of course, could not fail to produce, even without any particular efforts of the inhabitants, a large and excellent breed of cattle, and such, indeed, it has. In that country we find a breed which, in its purity, can be found nowhere else, unless it has been imported. It is known through all Europe by the name of "Lowland Cattle" (Niederungs-Rasse or Marsch-Vieh). It is at home on the whole southern border of the German Ocean, west from the mouth of the river Weser. East of the mouth of that river it can not be found in its purity, unless it has been recently imported; for there it is not at home, and there the imported animals—although exports into that country, east of the Weser, are taking place every year—are crossed with the native inferior animals. Still, a so-called "Holstein Breeders' Association," somewhere down East, has made the blunder of naming that breed "Holstein Cattle," which can have happened only by mistaking the name "Holstein" for "Holland," as both names commence with *H-o-l.* A look at the map of Europe will show the blunder.

The Lowland-breed, however, is not everywhere exactly the same; it exhibits some differences as to size, qualities, and slight variations in color, due, principally, as far as size and qualities are concerned, to differences in its native soil, and differences in the agricultural management. If, in visiting those Lowlands, we commence traveling at the mouth of the river Weser, crossing that stream at Bremerhafen, we come first into a small peninsula of about 200 square miles, between the river and a small bay, the "*Jade.*" This peninsula belongs to the grand duchy of Oldenburg, and is called "Butjadingen." Going, then, from the point where we have crossed, about half-a-dozen miles against the stream—that is, in a southern direction—we come into a part of the country which consists almost entirely of alluvium deposited by the river, and is distinguished by its pastures unsurpassable in fertility and nutritious grasses. There we find the Lowland cattle in their greatest perfection, of a large size, handsome, and well proportioned. Traveling from there westward, we find the cattle of nearly the same excellent quality, till we reach the border of the alluvial soil, where it joins the original *terra firma*, which is very poor and sandy. But traveling west, not more than about twenty miles, and turning then to the north, we come into another province

of Oldenburg, Jeverland, on the west of the bay Jade; and there proceeding north, we find, soon, a material difference in the alluvial soil, and also in the cattle. There the soil is an alluvium of the sea; is lighter and better adapted for the production of crops than for pastures; there we do not see pasture joining pasture, but, instead of them, innumerable grain-fields—an indication that there grain-growing is the predominant branch of farming, and stock-raising of an almost secondary importance. Still the breed of cattle is the same, but the animals are not as large, and have not the beautifully developed and symmetrical forms we met with on the east side of the bay, between the latter and the river Weser. If we take again our course westward, after we have reached the border of the sea, we soon come into Ostfriesland, (East Frisia,) and if we do not get away too far from the coast, we can travel on alluvial soil till we reach the boundary of Holland, and find everywhere nearly the same soil, and the same cattle, till we come near to the mouth of the river Ems, in the western part of Ostfriesland, where the whole feature of the country is changed again. There the soil again consists chiefly of river alluvium, and there pastures become more frequent, though, perhaps, not prevailing as in Butjadingen, between the Jade and Weser. There the cattle also are large—larger than in the eastern parts of Ostfriesland—but have not the beautiful and symmetrical form of those east of the Jade; are somewhat superior for the dairy, but of less value for the shambles.

If we cross the river, and then pass over the German boundary into the Dutch or Hollandish province of Groningen, we find a great many dairy-farms and abundance of grass-land. The cattle there are large, of a really imposing size, superior to any cattle in the world as far as production of milk is concerned, but inferior as to form, beauty, and consequently, also, as to fattening tendency, to those raised on the extremely fertile and heavy soil of Butjadingen. Consequently, we are justified in distinguishing three different branches or divisions of the Lowland breed of cattle, notwithstanding the breed in those countries described is everywhere of the same stock and origin. These differences are caused solely by the differences in the soil, and the differences in the agricultural husbandry. A special, that is, a careful and judicious, selection of breeding animals, has but very seldom taken place, and then only in single instances; therefore, the farmers there can neither be censured nor praised for having an excellent breed of cattle; nature, almost alone, has wrought and produced those excellent qualities, and also those differences. Hence, this Lowland breed has to be considered as one that is yet capable of improvement.

As to quality of the milk, tendency to fatten, large size, and beauty of form, the cattle of Butjadingen, in the grand duchy of Oldenburg, surpass all others; as to quantity of milk, the cattle in the western part of Ostfriesland, near the mouth of the river Ems, and in

the dairy districts of Holland, have to be considered the superiors, while the cattle in those agricultural districts between Jade and Ems, where the tilling of the soil is the most predominating branch of agriculture, although comparatively just as milk-yielding, are the smallest and the least attractive ones. But we will first give a general description of that really excellent breed.

In Allen's "American Cattle," on pages 170 and 172, we find two very good pictures, with the erroneous superscription of "*Holstein* Bull," and "*Holstein* Cow," of which the former is a fair representative of the Lowland breed, as found in Butjadingen, and the latter as found in Holland.

The characteristics common to all three branches of the Lowland breed, which distinguish the same from any other, may be given as follows: A thin head, tapering more or less toward the mouth; thin and short horns, standing rather wide at the base, the tips curving inward, frequently with a downward inclination; a long and thin neck, without a dewlap; a very long and deep body, strongly developed hind-quarters, a long and thin tail, a large milk-mirror, and, in cows, a large, soft bag, and well-developed milk-veins reaching far forward; medium legs, but good, strong hoofs; a fine and thin skin, a smooth and glossy coat, and invariably a black, black and white or white and black color. A red or roan color is never found in a pure-bred animal.

The western branch of the Lowland breed—that is, the cattle in Holland—are animals with long body, but rather angular in form. The head is long, and so is the neck. The back is rather sharp, and the ribs frequently a little flat. The sacrum or crupper bone is high, short, and rather arched or convex, so that the long and thin tail commences too low. The pelvis (rump) is comparatively wider than it is long, which gives the animals, when not in a very good condition, a rather bony appearance. The bag of the cow is extremely large, but not fleshy, and extends far forward and backward; the teats are wide apart, long, large and full, and the milk-mirror and the so-called milk-veins are large and well developed, the latter extending far forward. The skin is very fine and thin, and the hairs short. White and black, or white and black spotted, are the predominating colors. Black animals, or black ones with comparatively little white, are scarce. The new-born calves are extremely large, and weigh not seldom from one hundred to one hundred and twenty pounds, (two pounds make one kilogram.)

The cattle of Butjadingen, in the grand duchy of Oldenburg, have shorter and smaller heads, more tapering toward the muzzle, the forehead middling broad, and the face generally a little dished. Their necks also are not quite so long; their backs are straight and fleshy—perfectly straight in the best and purest specimens; their ribs are more barrel-shaped and their chest wider than in the cattle of Holland; their loins are full and level, and the crupper bone, as well as

the whole pelvis, from the loin and the hips to the root of the tail, is long, and the former not enough arched to interrupt the straight line; hence the tail does not come out too low, but sets on a level with the back. The legs are comparatively shorter than those of the Dutch cattle; the skin is a little thicker, more mellow to the touch; the hair is a little longer, and the animals are hardier. Their predominating color is black, with but little white. Black animals with white extremities (lower part of the legs and of the tail) are frequent; white or mostly white animals are scarce and not fashionable. The cattle of Butjadinger, although exhibiting all the characteristics of excellent milkers, in a remarkable degree, probably do not yield quite as much milk as the Hollandish or Dutch cattle—that is, as far as quantity is concerned—but surpass them in regard to quality. The same also belong to the largest and heaviest cattle in the world. At the county fair at Rodenkirchen, in the grand duchy of Oldenburg, I saw in 1864 a four-and-a-half year old steer on exhibition, belonging to that breed, which weighed 4,100 German pounds, (2,050 kilograms;) and a three year old bull of the same breed, belonging to W. Ulbers, Esq., received the sweepstakes at the International Agricultural Exhibition in Hamburg in 1863.

It is self-evident that such an excellent breed of cattle has attracted the attention of breeders and dairymen all over Europe, and has been exported to many parts of Europe for the purpose of crossing with and improving other breeds. In that way it has contributed considerably to the origin of many a valuable race of cattle now counted among the middle breeds, and indeed, it is not only that we can trace the blood of these Lowland cattle in a breed at present considered a model of perfection—Durhams or Short-horns—but upon close investigation, we also are compelled to acknowledge that the most valuable properties of that and some other famous breeds—that is, as far as large breeds are concerned—have been derived from the Lowland cattle of the North Sea shore. It is further self-evident that on the borders of the above described Lowland districts, with their fertile alluvial soil, crosses with other cattle have taken place, and that in that way more or less distinct, though not pure, breeds have been produced. As such, I will only mention, among the breeds of cattle on the European continent, first, in the west: the Norman breed in northern France—undoubtedly one of the parent breeds of our Short-horns; the Flemish breed in Belgium, etc.; in the east: the cattle between the mouth of the river Weser and the river Elbe; the Holstein cattle, east of the mouth of the latter river; and the cattle in Schleswig and Denmark, which, however, are nothing more than the products of crossing between the Lowland cattle and the common red cattle of middle Europe. As an unmistakable evidence of those animals being mere products of crossing, we find among the same, but especially among the Norman, Flemish, and Holstein cattle—in the cattle of Schleswig or of Angeln, and those of Denmark, the pro-

perties of the common red cow are too much predominating—all varieties of form, size, properties, and especially of color. Respecting the latter, black, black and white, dark-red, light-red, yellow, red and white, roan in all possible shades, mouse-colored, etc., are found in all possible modifications.

Hence, that erroneous name Holstein cattle, which now and then is given in this country to the Lowland cattle, should be abolished, and should never be used, unless it is to signify those animals that really are natives of the duchy of Holstein. But the latter scarcely ever will be imported into this country, for I doubt very much whether they would pay the fare across the Atlantic; they are products of crossing, and altogether too much scrub.

THE INFLUENCE OF MINING INDUSTRIES ON AGRICULTURAL PURSUITS.

OUR MINERAL DEPOSITS, AND AGRICULTURAL AND HORTICULTURAL CAPACITIES.

BY R. O. THOMPSON.

The indissoluble ties which unite mining industries with the agricultural pursuits of every land are so apparent, and have at all times, and under all circumstances, so marked and beneficial an effect by such association, that it needs no argument or apology here for the introduction of a paper upon the mineral deposits and mining industries in the annual report of the State Board of Agriculture.

The want of a home market for the great surplus cereal crop of Central and North-west Missouri has long been felt; the thousands of bushels of grain which each year are held for a remunerative price, or to be one-third consumed in transportation to a market, by the development of the vast and varied mineral deposits of the south portion of the State would all be required, at good prices, to subsist the thousands of laborers in mine, furnace and factory.

The incogitative mind, with its want of thought, will never become an inquirer, searching for or examining the cause of our deferred success, which lies at the base of our domestic and commercial structure, and which, to-day, holds a great portion of our surplus products subject to the advance or decline of a market outside of our own State. We have, unfortunately, too many among us who are incommutable, and will not be changed from the old system of mining, manufacturing and farming. Each one has pursued his own peculiar, exanimate, lifeless, spiritless course, regardless, perhaps

thoughtless, of the great benefits he might derive himself, and the great and good example he might give to those around him, if he would study carefully the source, supply, formation, manufacture, change, character and relation of every article mined, produced or manufactured. To study the dependence of one article upon the production, change or sale of another, should find a lodgment in the mind of every inquiring, reflective citizen of the State.

At this time, agriculture and mining industry are as far apart as is possible to separate them in our State; there seems to be no sympathy or dependence existing. We should emulate the example presented in other States: enucleate, solve and clear the great intestine problem.

As an illustration of the influence mining districts and their industries have upon the agriculture and horticulture of a country, we will take the State of California, which, previous to the development of her gold, silver, copper, quicksilver and other mineral deposits, was considered mostly as a sterile and unproductive territory. Enterprise, urged forward by the prospect of fortune, soon gathered millions from her auriferous sands and primary rocks. A population soon settled there, that had to be fed and clothed; the food consumed cost almost fabulous sums—it cost more to live plainly in California at that time, than at any court of Europe with the finest suite of rooms and a retinue of servants. A remedy had to be applied; the more energetic, thoughtful and far-seeing commenced the solution of the problem. Wheat, oats, barley, rye, corn, buckwheat, potatoes, onions, beans, peanuts, tobacco, castor beans, and many other cereals and root crops, were sown and planted. The harvest came, and the wonder that had filled the thousands who beheld her golden wealth was changed to admiration deep, as the bounteous product of the field was garnered, to subsist the laborer of the work-shop and the mine. The knowledge of her mineral wealth, and the brave, untiring energy of those who first reared the monuments of mining industry there, together with those who unfurled the starry banner and planted its flag-staff in her productive soil, gave to the country as rich a heritage as nation could ask.

The production of California for the year 1869 may be presented, to exhibit the mutual relations of mining and manufacture upon horticulture and agriculture: Her gold production was $21,472,851; quicksilver, $1,500,000; coal product, $1,000,000; silver, $1,000,000; and other minerals amounting to $500,000; giving the mining product of the State at $27,000,000.

The yield of wheat was 20,000,000 bushels; barley, 8,000,000; oats, 1,200,000; corn, 1,000,000; rye, 16,000; buckwheat, 10,000; beans, 150,000; castor beans, 337,000; peas, 64,000; peanuts, 78,000; potatoes, 1,400,000; sweet potatoes, 75,000; onions, 70,000; butter, 5,000,000 pounds; cheese, 3,000,000; wine, 4,000,000 gallons; brandy, 300,000 gallons; grape vines, 25,000,000; apple trees, 1,200,000; peach trees, 1,000,-

000; mulberry trees, 10,000,000; with thousands of pear, quince, plum, cherry, fig, apricot, nectarine, lemon, orange, olive and almond trees; with millions of sheep, hogs, cattle, horses, mules, cashmere goats and poultry. The State had at that time 267 grist and flouring mills; 368 saw mills; 421 quartz mills.

The industrial production of the State for the year was $182,000,000; of which $89,000,000 was from agriculture, $75,000,000 was from manufactures, and of mining, but $27,000,000. Nearly forty-five per cent. of the revenue, or production of the State, was from agriculture; more than three times the production of the entire mineral wealth produced for the year; a little over one-sixth of the total production of the State. Is this not an example of results, so favorable to the connection existing between mining and agriculture, that we can afford to give it careful and thoughtful consideration? Here is a State that for several years produced but little to feed and clothe those who delved in her mines, or labored in her work-shops, now supplying us with fruits, honey, wool, hides, bees-wax, mules, horses, and many manufactured commodities. Her people had clear and comprehensive understandings of the country and its resources; they made one interest subservient and conducive to the welfare of another. They gave to mining industry a guarantee of support, in subsistence of its labor; without long having to send their gold abroad, to buy the necessaries of life, they began at once, almost, to be self-sustaining. The capital that went there to open the mine, build the mill and erect the furnace, had to pass over its share to agriculture; and all the elements and constituent parts, that go into the composition of a country's prosperity, were here carefully studied and wisely applied.

In California, Idaho, Montana, Utah and Colorado, the mining localities are far more remote from the agricultural districts than in our own State; but we present in geography and topography a large metalliferous district, almost as isolated and uninviting to the agriculturist as portions of the States and Territories named.

We used California to illustrate the advancement of agricultural and manufacturing progress; not to compare her golden sands and rocks with the coal, iron, lead, zinc, cobalt, nickel, copper, antimony, silver, manganese, kaolin, glass sand, marble, porphyry and granite of our own Missouri. The comparison would not approximate. The golden harvest gave a quick prosperity to the Pacific State; she became an Eldorado at one bold step—the end of success was not possibly eludible. The nations of the world who gave their entire energies to the production of gold and silver, for any considerable time, have passed to the estate of anarchy and beggary, unless agriculture was invited to go hand in hand with mining and its manufacturing industries. Look at Spain, Portugal, Peru and Mexico! Their glory has sunk in the oblivion their greed of gold had created. The too secure ambition and safety the abundance of precious metals gave to these powers lulled them to security for the time, with no thought of developing

their rich and productive lands, for the food to subsist their wealthy millions. When their gold deposits gave out, or their wealth-cloyed citizens became too indolent to further produce their golden harvests, they quickly sank to a poverty, and a moral standard, miserable to behold.

Here, in the great State of Missouri, we have a grand diversity of soil, climate and mineral formation. We are not confined alone to coal and iron; yet enough of these exist to create a destiny of empire, progress, power and prosperity, not second to England, which has controlled the pecuniary, commercial and social elements and conditions of the world for centuries, by her coal and iron, and the manufacture resulting from the association and necessary unity of the two. With all this prosperity was united and allied by kindred ties, a complete and extensive system of agriculture. In fact, the true and permanent basis of any country's prosperity consists in her ability to supply her entire population with food, clothing and all the necessaries of life.

A great mineral-bearing State like Missouri can not become, in her agriculture, horticulture and stock-growing, the great producing empire which she is capable of becoming, unless her mineral resources are developed, that manufacture may originate a market for the product of the farmer. It is a false economy to ship abroad the products of our soil, unless they have passed into a manufactured form, condensing a greater value than in the original state.

More than one-half of the 42,000,000 of acres of land contained in our State is mineral-bearing; not to mention the great coal-fields of North and West Missouri. The physical features of the metalliferous districts, or territory of our State, are as varied and unlike as were ever exhibited in the topographical characteristics of any country.

Taking the Missouri River as a northern boundary, and commencing at the dividing county line separating Cooper and Saline counties, passing thence south westward, the entire region east of these lines may be considered a mountainous one. The western portion of this indicated district presents the magnesian limestone series, as the mineral-bearing rocks. Through Vernon, St. Clair, Hickory, Cedar, Camden and Laclede, and in a few counties further east, an old decomposing saccharoidal sandstone is presented, passing from north-west to south-east. This sandstone presents, in its composition, in several localities, from ten to eighteen per cent. of the oxide of iron. In Vernon and Cedar counties, this sandstone covers the coal series in two localities examined by the writer. But the great and reliable metal-bearing rock of the country is the third magnesian limestone that extends over a great portion of the territory bounded as we have indicated.

In the South-eastern portion of the State, the porphyritic and granitic formations are presented, and the vast deposits of minerals evidently exhibit unmistakable evidence of volcanic action.

The submerged or the swampy country of South-east Missouri was undoubtedly depressed at the time, or soon after, the great convulsion which originated in its present form, or elevated, the Iron Mountain and other elevations of like nature, in that district. The swampy lands contain millions and millions of tons of bog-iron ore, which seems to be the only mineral of any value.

Missouri contains iron ores in more than sixty counties. In twenty-eight, they are so far proved to be large and permanent deposits, that their ability to furnish all the iron needed by the commercial world is no longer doubted.

The vast iron deposits of blue specular, silicious specular oxides, magnetic oxides, of Iron Mountain, Pilot Knob and of Shepard Mountain, have all been examined, reported and partially developed. Of these, we shall only give hasty mention.

The amount of blue specular ore at Iron Mountain, above the level of the valley, is more than 320,000,000 tons; what there is beneath, conjecture and speculation now alone can determine.

The ores of Pilot Knob are silicious specular oxides, and are estimated, above the surface, to contain more than 14,280,150 tons of ore.

Shepard Mountain is composed of magnetic oxide and specular ores, with fissures passing down perpendicular in the porphyry. The extent of the deposits, therefore, can not be estimated. But enough has been developed to show the veins to be of permanent formation, and probably passing down to an immense formation beneath.

In Madison, St. François and Ste. Geneviev counties are also found iron deposits, closely associated with volcanic and gneissoid rocks; and are evidently azoic ores, with clearly defined characters of igneous origin. Many of these will no doubt yet present valuable iron banks.

In Perry and Cape Girardeau counties, iron ores are shown in several localities.

In Reynolds county, upon lands situated along the various Black River heads and tributaries, within the past year have been discovered immense beds of specular iron ores, of good quality. Also, large deposits of limestone ores occur in several localities; and in the northern portion of the county, in section one, there is shown an iron formation in a large porphyry dyke.

In Ripley, Oregon, Howell, Ozark, Douglas, Shannon and Texas counties, there are presented surface ores of specular, chromic, red oxide and hematite, in more than eighty localities, where dykes or banks of ore occur. These localities are yet remote from any means of transportation, and have not been developed to any considerable extent.

Crawford county has twenty well-defined iron banks, and a large number of other good surface indications. The ores are red oxide and blue specular, with chromic and carbonate of iron in two localities.

Dent county contains a remarkable variety and immense formations of iron ore, of blue specular, oxides, spathic and various other ores. Simmons' Mountain is a remarkably fine fibrous structured and tabular crystalization of specular ore; a remarkable formation of very poor iron, scarcely a true specular, so closely united with hematite that it will smelt easily—a vast mountain, going down, down into millions of tons of this ore. Phelps county contains eighteen well-defined formations of red hematite ores, and many more of brown hematite are found in various parts. John M. Taylor's banks in this county are red hematite and blue specular combined, in almost unlimited quantity. Buckland's, James' and many others are the same valuable ores, that require but little or no flux in their reduction. I am led to believe that the iron formations in this county are the most extensive of any in the State—its entire territory, perhaps, resting upon one vast iron crust, many feet thick, but holding beneath in imprisonment many other valuable minerals.

In Pulaski county there are presented many surface ores, indicating the existence of extensive deposits beneath.

In Camden county there have been discovered large dykes of chromic, specular, hematite and jaspery iron ores, in great numbers. In this county there has been so remarkable an iron deposit opened, that the manufacture of iron is soon to be commenced there.

Miller county shows iron formations in some thirty localities; Maries in ten, and Osage in three. Moniteau, Cooper, Morgan, Benton, Hickory and St. Clair give evidence of extensive banks of brown hematite and the ores called "pipe ores;" but there has been no development to determine their extent.

Cedar county has eight localities where the hematite ores are exhibited in large quantity, and in massive formations.

Laclede, Dallas, Polk, Greene and Dade counties all contain iron banks not yet developed.

Webster, Christian, Stone and Lawrence counties have all the surface ores to indicate a large mass underlying many square miles of their territory. Taney, Barry and Barton counties contain iron deposits.

No examination has been made in any of these counties, looking toward their development, and surface ores alone indicate the extent of the deposits.

Lincoln county presents a most splendid blue specular ore.

Franklin and Gasconade counties show several fine banks of various kinds and qualities of ores.

Commencing at Cuba, Crawford county, going along the A. & P. Railroad for fifty miles westward, there are fifty extensive iron banks met with. In a distance of 125 miles along the Osage River, iron deposits are seen almost everywhere. Along the Meramec 140 miles, there are presented iron ores in more than a hundred places. North

of this line of railroad, most of the iron ores seen at the surface are of the hematite class.

In Cole county, some eight miles from the Moreau, there is a large deposit of brown hematite ore; a mass protruding through the earth is in form of a pyramid. Not having been in the least developed, it is impossible to estimate the extent of the bed. Iron has not been found in any considerable quantity in this county, if we except two or three localities in west and north-west portions. The characters of the ores nearly all tend to the limonite class, or, as they are termed, brown hematite. On the farm of Mr. Robert Scott there is presented a considerable deposit of a brown hematite ore. The portions that denudation has exposed show considerable oxidation. In three other localities in Clark township the same ores are observed. Farther south, in the vicinity of Brazito, Hickory Hill, and along the Jefferson City and Shiler Ferry road, we have observed considerable surface ores of the hematite class. Yet, in one or two cases, ores that seemed to be of the limonite class proved by their streak to be blue specular.

The same peculiar characters are contained in the Lincoln county ores, as presented in those heretofore thought to be brown hematite in Cole county.

In two or three places, so much of these ores occur at the surface, that an examination looking toward their development will no doubt be made, and thus large deposits may be found of sufficient magnitude and purity to warrant the construction of furnaces and the manufacture of pig iron in the county. The two ores are usually easily detected by their surface indications and streak; yet these are very difficult to determine. The brown ores, when they are pure, contain 85.6 of peroxide of iron and 14.4 water; the streak, when the iron ore is rubbed against any hard substance, is yellow; under the blow-pipe it shows magnetic qualities. The ore is quite soft, and when heated under a glass shows water in distinct globules. Its surface is smooth and stalactitic, with a fibrous structure, sub-metallic luster, found in association with the rock of all ages; has, no doubt, been formed by the decomposition of the sulphurets.

The extent of these thousands of known iron deposits can not well be determined; but very few—not one in a hundred—have been developed, and they but to a very limited extent. This inexhaustible supply of an element that constitutes so marked a power and influence upon the prosperity of any country, here in Missouri, if developed promptly, and the manufacturing and agricultural pursuits keeping pace with the mineral development, will all unite to render us a most independent, prosperous and self-sustaining people.

COPPER ORES OF MISSOURI.

The copper formations of the State are at once highly interesting to any one who has studied the general geological character of the

country; and may be classed as red oxide, blue and green carbonate, yellow and gray sulphuret, black oxide and purple copper occurring in one or two localities, that seem entirely distinct from any we have named. The strata of the rock in many places present true copper veins; and where fissures are found, the ores seem to be crystalized masses, formed by the confined condensation of gases at the time the fissures were made by eruptive origin.

One of the most interesting and valuable copper mines in the State, thus far developed to any extent, is the Stanton Copper Mine, of Franklin county. The ore is classed by Prof. Swallow as being a mixture of gray sulphuret and the green carbonate. Analysis shows 54.8, 58.16 and 61.15 per cent. copper in three assays made. The copper ores presented in this county, number more than twenty localities; and all are found to be in lodes or fissures with limestone walls; their permanency, therefore, may be looked upon as entirely reliable.

In Washington county there are a large number of copper deposits. At Walden's mine there were developed, some twenty years ago, very fine deposits of the green and blue carbonates. In the entire galena-bearing portion of the county, there is evidence of large and permanent formation of copper.

Crawford, Dent, Phelps and Shannon counties may be said to contain the great red oxide deposits of Missouri. These ores, with the carbonates, which present themselves first as we puncture the great iron covering, as shown at James' iron bank, a mile and a half south of St. James, in Phelps county. We are fully convinced that the ores of iron, known as red oxides, as their banks are penetrated, will show the carbonates and oxide of copper in great richness. In Crawford we find a number of clearly defined copper formations; in Dent as many more; while in Shannon it is believed the most extensive copper formations in the State exist.

In the St. Joe lead mine there has been discovered a vein of the yellow sulphuret of copper, and in portions of St. François county and elsewhere, are exhibited copper ores in fissure veins, where the igneous action is plainly traceable as the source of their origin.

In Pulaski, Camden, Webster, Greene and Christian are many surface indications of copper, and in two or three localities there are found copper pyrites that will assay 12 to 18 per cent. of copper.

Hon. Oscar Von Kochtitzky, of Laclede county, placed in our hands a nugget of copper pyrites and the yellow sulphuret, which came from a lode in his county, that he represents as occurring in the openings of a carboniferous limestone.

The great copper belt of Missouri does not pass north of the Missouri River, or little, if any, east of Franklin county, until we pass below the Meramec River where it touches Jefferson county.

Along the line of the Attlantic & Pacific Railroad, commencing at Franklin and ending at Neosho, there are more than one hundred

indications of copper presented in various forms, and many of them, no doubt, will prove to be permanent in formation and rich in metallic copper.

Upon the farm of Mr. J. G. Blanchard, in Iron county, near Annapolis, is found the green carbonate of copper.

In Maries and Camden counties there is evidence of the carbonates of copper found in the lead-bearing rocks along the Osage River.

Miller and Cole counties have the green carbonate and copper pyrites. The green carbonate is found in a large deposit of sulphate of baryta, beautifully disseminated through the whole mass, in the western portion of Cole county.

Native copper has not been found in any permanent or considerable quantity in Missouri.

The black oxide of copper has been found in one or two localities, where the specular and magnetic oxides of iron have been forced to the surface by igneous action. This will, no doubt, present itself in commercial quantities, as those primary iron deposits, that have been erupted, are penetrated to greater depths.

The most extensive and regular lodes of copper will, no doubt, be found beneath the red iron ores, or commencing in them and passing down into true yellow sulphurets and pure metallic copper.

There is not the least necessity of the importation of a pound of copper into our State, but there could be thousands of pounds exported annually, if we would but develop one hundreth part of the deposits we possess.

The copper ores that have been mined in Missouri are only surface ores, and wherever well-established crevice lodes or disseminated formations present themselves in the rocks, they were never followed to any depth.

LEAD ORES.

The lead ores of Missouri have the most extensive range, in formation and association, of any territory of the same extent on the face of the globe.

In Franklin, Phelps, Crawford, Dent, and several other counties adjoining, galena occurs in the magnesian series of the Lower Silurian.

In Jasper, Newton, McDonald, Christian, Dallas and Pulaski, galena is found in the carboniferous formations.

In South-east Missouri, lead, in the sulphurate, carbonate, and other forms, is presented in the granitic and porphyritic rocks in dissemination.

In Iron, St. François, Jefferson, Madison, Wayne and Reynolds, most of these galeniferous deposits may be characterized as argentiferous, as abundant analysis has determined the presence of considerable quantities of silver in those lead formations. In the counties

last named, the lead deposits seem also to be permanently located in the Lower Silurian limestone formation.

In Jefferson county there is found, upon the lands of Dr. Dyer, beneath a deposit of iron, some sixty feet beneath the surface, a great lode, or bed, containing "boulders" of galena, whose octahedral system of crystalization is broken, modified and often entirely destroyed, by the action that no doubt elevated this iron from its primary bed, and allowed the cubes of lead from above to find a place beneath the iron, and under a period and degree of heat that lifted up the iron, the galena must have received its metamorphic character.

Also, over the whole territory named, there is found galena in the "tallow clay" gravel, in lodes, sheets, fissures, contained between walls of limestone, sandstone, iron, and masses of baryta. Also, in caves of magnesian limestone formation, and in calciferous sand rocks.

The extensive mining and well-known permanency of the great disseminated lead region represented by the Mine LaMotte and St. Joe companies, and the development of Captain Shaw and Mine a Joe mines, show deposits of the same peculiar formation, and the many years the lead mines of Washington and Jefferson counties have been successfully worked, have made for them a history we can not render more popular by a reprint of their reports heretofore made.

We shall therefore be more particular in describing a section of country until within a few months past deemed of no importance as a lead-producing region. It is true that the Granby mines in Newton county have been worked for many years; but not one hundredth part of the immense lead deposits of Newton, Jasper, McDonald, Lawrence, Dallas, Hickory, Morgan, Maries, Camden, Miller, Barton, Moniteau and Cole counties were even known or speculated upon, as likely to become the great lead-producing region of Missouri. All this region, representing many thousands of acres of land, presents galena called "float," in many cases exposed to the eye upon the surface by denudation. The mineral also is found in lodes between walls of magnesian limestone, within the same walls in close association with "tiff" or baryta, and occasionally in association with iron pyrites, and in cannel coal in Moniteau county.

The Bond mines of Morgan county present the sulphuret of lead in the lode form, surrounded with a compact ferruginous clay. All along the Gravois there is found galena in various associations. On the Swickerath property, and in many places in townships 42, 43 and 44, there are being mined large quantities of galena. On the Swickerath property the galena is found closely hemmed in by a wall rock of limestone, with a tumbling flint rock as an associate. Much of this mineral presents a class called in Europe "steel mixed," the crystalization being entirely changed, presenting a solid surface of ore found in a mass in no regular order.

The mines of Ex-Gov. McClurg & Co., at Linn Creek, in Camden county, are developing a large area of lead land in that vicinity. Camden appears to be very rich in the sulphuret of lead. In Maries county there are some five or six known deposits, and the mines of Carter and Hunsacker are yielding several thousand pounds per day of a first-rate quality of galena.

Newton and Jasper counties are very rich in lead ores; in the latter county the Joplin lead mines are among the most profitable ever opened in this State, and the rich ores do not seem to diminish as the shafts go down. McDonald county, within the past fourteen months, has given more than a dozen rich lead deposits to advance its claims as a lead-producing locality.

Galena is found in Osage, St. Clair, Cedar and Barton counties in limited quantity. Cooper and Pettis counties give small deposits of galena in the clay and magnesian limestone.

Miller county was considered for many years almost worthless, as regards agriculture or mineral bearing qualities, until the Simpson mines were opened, which proved one of the richest lead deposits discovered up to that time in the western or central portion of the State. This important discovery was soon followed by no less rich and valuable mines, as the Kintz, Fox and Walker, all of which have proved a new era in lead deposits and lead mining for Miller county. Every shaft sunk presents the very richest galena, found in openings in the limestone with "tallow clay" and baryta.

The development of this county had scarcely begun, yet the excitement always attending important mineral discoveries soon attracted the attention of capitalists abroad. Yet no definite or systematic plan of mineral development was commenced in this county until Mr. E. J. Crandall, a man who came to St. Louis and grasped its business capacities, building up one of the most extensive and reliable coal companies in the city or State, and could not long be confined to the narrow limits of one city or State, with his usual boldness and sagacity, characterized by a clear and discriminating judgment, looked over the lead-fields of Miller county. He was convinced they contained immense deposits of galena—backed his judgment by paying out thousands of dollars for lands that a year before would not command a half dollar an acre. The first purchase determined the organization of the Pioneer Mining and Smelting Company, with a capital stock of $500,000; whose organization consists of J. W. Conlogue, of St. Louis, President; D. W. Minshall, of Terre Haute, Indiana, Treasurer; Col. J. D. Slocum, Manager; A. V. Bohn, Secretary, and W. F. Batty, Superintendent, all of the city of St. Louis. Its directors are J. W. Conlogue, W. R. McKeen, D. W. Minshall, E. J. Crandall and A. V. Bohn. This company have developed a great interest and source of wealth to Miller county. From these mines, in a few months, more than half a million pounds of lead have been mined. They have three reverberatory furnaces, with a capacity of

10,000 pounds of lead per day. One is situated near the mines named above, one at Shiler's Ferry on the Osage river, and one on the Moreau in Cole county. The Pioneer Company secured in Miller, Maries and Cole counties many thousands of acres of the best lead, iron, timber and other mineral lands.

Cole county has a well developed "circle" mine of galena, called the "Old Spanish" mine. Lead was also known to exist in several other portions of the county, but to what extent speculation alone had determined until the discovery by Mr. Henderson of the remarkable lead deposit on the farm of Mr. Jefferson Scott, near Pratt's Mills, the past summer. The presence of sulphate of baryta upon the surface of the ground caused an examination to be made, which resulted in the discovery of a vast deposit of the sulphuret of lead, or galena, within *sixteen inches* of the surface. The formation at first was not a uniform one, but presented galena in the usual form, highly carbonated upon the outside; this was found in the whitish arenaceous clay of the locality, mixed with flinty rocks. Also, there was found galena in cubes, with the whole structure laminated in their scales, the whole cube of lamelar formation cemented together with a concretionary substance that proved to be the carbonate of lead. After sixteen inches of soil was removed, the next two feet of horizontal strata was *more than one-half pure galena!* This strata, or deposit, gave galena in sheets, not more than one-half inch thick, the outer surfaces beautifully veined with a net-work of delicately raised lines, the interstices between filled with a beautiful soft clay. Removing this, we find twenty inches of "tallow" clay resting upon a disrupted mass of "cotton" rock, sienite, flint and magnesian limestone, with a very hard and compact saccharoidal sandstone. In this tumbled mass lead veins, lodes, sheets and masses presented themselves upon every side. In this twenty inches, above the tumbled mass, there have been taken out solid cubes of galena, weighing from one to three hundred pounds! These are what is termed "float" among miners, and do not necessarily denote very rich mines; but the passage of lead in veins and lodes, in such richness as is presented in the rocks above described, reveals the richest lead deposit ever found anywhere. The mining up to that time was merely digging over the surface, in a very rude and unsatisfactory manner; but after the owner of the property had mined some sixty thousand pounds of ore in the space of a few days, the Pioneer Mining and Smelting Company purchased the mine, and secured, also, much of the adjoining lands. This company commenced a shaft upon this property the past week, and in sinking five and a half feet deep, four by six feet square, commencing six feet ten inches from the surface, took out over six thousand pounds of mineral of the purest quality ever seen. This was over *one thousand* pounds of lead to a foot in depth, four by six feet square, and this in regular lodes, pitching downward, at an angle of thirty-eight to forty degrees, with a trend E. N. E. This is presented upon three sides of

the shaft commenced. On the other side there is a sheet of mineral passing S. W., and dropping downward, of about eight inches in thickness by two and a half feet wide.

About sixty feet north of the first shaft sunk, another, going down fifty-five feet, presents the same general richness of galena. A third shaft, still farther north, presents uniform veins and lodes of lead in the limestone, and with and between regular stratified layers of the sulphate of baryta. In these three shafts, there is presented to the eye more than 100,000 pounds of mineral, by the excavation thus far made, and the lodes now struck in the shaft, and the heavy veins passing into the limestone, indicate a continuation that may be considered permanent, and of immense wealth to the company who have secured it. We feel richly repaid for the time spent in visiting this great discovery, so much richer and more accessible than we expected to find.

Several other shafts have been sunk in the vicinity, and in all, the same deposit of galena with associate minerals is found. This company in this purchase exhibited their usual foresight, in thus securing the richest lead mine we have ever seen. With the large lot of lands they have bought and leased adjoining this and passing along this rich mineral belt it is worth more than $200,000; in fact its value can hardly be estimated at this time, but enough has been developed to warrant the statement we have made.

In the vicinity of this remarkable mine, there are more than thirty places where galena is found in the same peculiar formation. Near Mt. Pleasant and near Locust Mound, large deposits of galena exist. At Russellville and near Centertown, galena is also found in paying quantities. But a few years ago, it was not deemed probable that Cole county could have any considerable formation of galeniferous ores. I am led to believe the whole western portion of the county is underlaid with a disseminated galena, occurring in the older limestone formation, and extending to within a few miles of Jefferson City; the outlines of the deposits may even extend to the river at the capital.

The space this paper now occupies will preclude the making of any general report upon the many other minerals contained in the State. The great bituminous coal fields of Middle and North Missouri contain billions of tons of valuable fuel, placed by a wise Creator beneath the destroying agencies of time. This stratified fossil vegetation, once the tiniest of plants, alike the loftiest representatives of tropical sylvan shades, that were years and centuries taking on their stores of carbon, to give to millions of beings a cheap and efficient fuel and agency of mineral reduction—our coal fields of North Missouri, containing, in one stratum alone, more than 65,389,874,321 tons of coal—yet do not send a bushel for the manufacture of iron, or to the coke pit or oven; the princely city of St. Louis consumes 24,842,344 bushels of coal annually; of this coal but little, if any, comes from the

Missouri coal fields. Illinois, without the burdens of taxation of the great city, sits calmly by and receives our ducats for millions of tons of coal yearly.

Within a reasonable distance for transportation, exist the vast coal deposits of Montgomery, Callaway, Boone, Audrain, Randolph and Monroe, which would supply St. Louis and reduce our ores for hundreds of years to come. In Cole, Callaway, Osage, Miller, Morgan, Benton and Maries counties exist vast beds of cannel coal, sometimes intersected by stratas of bituminous coal.

The great and permanent deposits of bituminous coal in North, West and Central Missouri are needed to smelt the iron, lead, copper and every other mineral we possess. The great furnaces and workshops of all the reduction and manufactures from our minerals, should be built along the Missouri and Mississippi rivers; their thousands of laborers there to consume, at remunerative prices, the thousands of bushels of grain, the cattle, hogs and great quantities of fruit from the agricultural producing portions of the State.

The inseparable bond of unity that binds together a manufacturing with an agricultural district, with so mutual an interest, should stimulate every citizen of Missouri to an early and intelligent development of our mineral, agricultural and manufacturing wealth.

ASPARAGUS AND ITS CULTURE.

BY J. F. WIELANDY.

Among the culinary vegetables, few can be found that are more advantageous to cultivate than asparagus, as well for private use as for marketing purposes. It is prized not only for its flavor, which is extremely palatable to most persons, but also on account of its precocity, making, as it does, its appearance upon our tables when the first sunny and warm days of April appear among us, as the welcome harbingers of spring.

While asparagus is a luxury greatly valued by epicures, it is also one of the most salubrious of vegetables; and, although I am not aware that the precise nature of its properties has ever been settled by systematic experiments, there can also be but little doubt that asparagin—the active substance contained in the young stalks, which imparts its slightly bitter and characteristic taste to the plant—acts in no inconsiderable degree upon the kidneys and spleen as an aperient and deobstruent. In some countries of Europe physicians not infrequently prescribe a cure of asparagus, in the same manner as they will order a grape cure, and which consists, simply, in eating copiously of this vegetable daily, during its season—a most agreeable remedy, it must be owned.

Asparagus, named botanically, *asparagus officinalis*, also called sparagus, sparage, and, vulgarly, sparrow-grass—is supposed to be a native of the more southerly portion of Europe; at any rate, it is found growing wild in many places of the littoral of the Mediterranean sea, its stalks averaging, perhaps, the thickness of a coarse whathaulm. It has been cultivated in Europe as a garden plant from time almost immemorial, yet few persons understand its culture sufficiently to enable them to succeed in growing asparagus to as large a size as this plant is susceptible of attaining. Perhaps the taste of large asparagus does not differ materially from that of the small shoots commonly grown; but the gardener who cultivates this vegetable for profit will very readily appreciate the difference in his gains,

inasmuch as large asparagus, averaging from three to five inches in circumference, such as my own beds produce every year, will sell readily for four times the price of the bunches of small and spindling stalks usually offered for sale by hucksters in the markets of our cities.

Much difference of opinion has prevailed concerning varieties of the asparagus, some contending that there are several, others that there is only one variety, and that its variations are simply due to differences of soil and climate. These views are neither of them strictly correct. Culture has originated two sub-varieties, distinct in appearance—one with green, the other with purple-tipped shoots. It admits scarcely of a doubt that these will assimilate in the course of time, if grown in the same soil, and subjected to the same mode of cultivation; but both retain their characteristics for some generations at least, even if planted side by side. The purple sort only is worthy of cultivation. It is likewise true, that even the so-called giant varieties might easily retrovert to the original wild type, if care and cultivation were withheld for a certain space of time; but it is not the less true, that no amount of good culture and care will cause roots grown directly from seed gathered from the wild species, or from an inferior cultivated variety, to produce stalks equaling in size and quality the enormous shoots we obtain from varieties long improved by constant high culture, and the most careful selection of seed. It would require many generations to bring about this result. It seems to me unreasonable that any one should undertake to contend that, alone among garden vegetables, the *asparagus officinalis* is exempt from the tendency to sport so generally displayed by all cultivated plants, and I may add, manifested by wild plants as well—for even among the oaks and grapes of our forests, the close observer can readily discern a constant tendency to a production of sports.

Some years ago, I had an interesting controversy over this very point with Peter Henderson, the celebrated New Jersey market gardener, and author of "Gardening for Profit," and "Practical Floriculture." He claimed that asparagus is confined to only one variety, and that the so-called "giant" can be made gigantic or otherwise, just as we will it, and that the "purple-top" variety will become a "green-top" whenever the composition of the soil is not of the kind to develop the purple, and *vice versa*. These are his own words. In controverting his argument, I told him that I admitted that to a certain extent, and in a certain sense, this was true, but that it would take the constant and minutest care of a man's life-time to accomplish this result.

Like most self-made men—who have achieved a high reputation and an eminent position in some particular vocation or calling through their own unaided talents and energies—Mr. Henderson is inclined to be somewhat self-confident in his own views; and he appeared a little surprised that an obscure Missouri farmer should dare to ad-

vance opinions conflicting with his own on a point in which he imagined himself perfectly at home. In one of my letters I took the liberty to tell him frankly, that the mode of cultivating asparagus laid down by him in "Gardening for Profit"—a book otherwise very interesting, and meriting an extensive circulation — was entirely faulty, and that no one, by following his method, could ever succeed in raising large and fine asparagus, such as I considered fit for market.

He finally ended our discussion, which had been carried on throughout in the most friendly spirit on both sides, by writing to me that he would settle the matter by actual experiment; and the result was, that two or three years subsequently I received a letter in which he gracefully acknowledged himself to have been mistaken. His experiment was carried on by simply planting a few rows of Conover's Colossal asparagus side by side with the common sort, and treating them exactly alike. In the course of two or three years the difference between the two became so palpable as to satisfy even a casual observer. It must not be thought, however, that even Conover's Colossal asparagus will long retain its superiority over the common, unless the standard is kept up by constant high culture, and the most careful selection of seed from the largest and most improved plants.

But Mr. Conover is not the only one who can claim to have originated a large variety of asparagus. Last spring I exhibited to the members of the State Board of Agriculture, three fresh shoots as specimens, which exceeded in size the highly drawn wood-cuts and glowing descriptions of his variety paraded in the catalogues of New York and Boston seedsmen. The three were cut at the same time from the same plant, and averaged about eight inches in length, and five and three-fourths inches in circumference. Their aggregate weight was nineteen ounces, which is about the weight of an ordinary bunch of twenty or thirty small asparagus, such as are commonly sold in our markets. This is my own variety, cultivated by my father and myself for a period of over forty years, and its great size is due to the most thorough culture, an abundance of rich manure, and careful selection of seed—the two or three largest and most thrifty plants in each bed being never cut, but always allowed to remain as seed-bearers. Starting with the best variety he could procure, my father has succeeded, in the course of five or six generations of asparagus, in attaining the results here recorded. Thus it will be seen that, whether due to natural or human agencies, the law of selection proclaimed by Darwin holds good with this, as it does with all other organized beings of creation.

It is due to myself to add here, that the statements made above are not made for purposes of speculation. I have a thousand or two one year old roots of my large variety in my seed-beds at home, but have none for sale, as I intend to reserve them all for my own planting.

PROPAGATION.

Asparagus is commonly propagated from seed, which should be sown as early as the ground will admit of working in the spring. I is claimed by some persons that it may also be increased by division of the roots in the same manner as we propagate rhubarb; and, asparagus being to some extent a dicœcious vegetable—that is, having the stamina on one plant and the pistils on another—this mode of propagation might be advantageously employed to exclude the female or pistillate plants, thus getting rid of the annoyance of a spontaneous growth of little asparagus frequently found to infest the beds. This process may do well enough for amateur gardeners who merely propose to plant a small bed for family use, but I apprehend that it will hardly answer for market gardeners who grow this esculent on a large scale; and besides, I doubt whether it is likely to result in a growth of healthy, vigorous plants. As asparagus is a hardy perennial vegetable, that may be grown for twenty consecutive years without renewal, if proper care is bestowed upon the formation of the beds, it is a matter of some moment to procure a good stock of plants, and for this purpose I prefer plants raised from the seed to pieces of old roots, as more likely to prove productive and long lived. I do not presume that many of my readers intend to make it a business to raise asparagus roots for sale; and to such as only propose to set out a small bed of a few hundred for family use, I shall say, that in my opinion, purchasing the roots will be found quite as convenient and cheap as raising them. I shall not, therefore, dilate upon this subject at much length.

The seed should be swelled in water or tepid milk until it is ready to germinate, and sown one inch deep, in rows at least one foot apart, and thinned out to four or five inches in the row. If the land is thoroughly prepared, and enriched with well-rotted manure, and kept well weeded and constantly stirred with the hoe during the growing season, the plants will be of the proper size to set out the following year—that is to say, one of them will weigh as much as ten or fifteen of the little roots commonly sold in commerce. Careful culture will save one year in growth and make greatly superior roots, as they will be larger and more thrifty than two or three-year old roots usually sold by seedsmen. Plants thus grown from carefully selected seed would be cheap at three times the cost of common roots; as for me, the latter would be too dear at any cost, for I would not plant them.

MODE OF PLANTING.

The ground being thoroughly subsoiled or trenched, taking care, however, not to bring the subsoil to the surface—for it should be remembered that the tendency of asparagus roots is not to dive

very deeply into the soil, but rather to run horizontally with the surface of the ground a few inches in depth—I have known them to extend ten feet and even further from the center of the plant—and being further thoroughly enriched with an abundance of the best and fattest stable manure—for asparagus is a greedy plant that can never receive too much rich food; trenches are dug with the spade or plow, at distances not less than three feet from each other, and the roots spread out carefully at the bottom of the trenches, at the depth of at least ten inches from the surface level. The plants should not be placed less than two feet apart in the rows, and if a crop of very fine, large stalks is desired, three feet would not be too much.

Here Mr. Henderson's method, as described in "Gardening for Profit," is entirely at fault. He advises to "plant in rows three feet apart, the plants nine inches apart in the rows, covering the crown or top with about two inches of earth." The great majority of consumers will not buy asparagus unless it is blanched, and for this purpose it must be marketed at the point of its growth when the top of the shoot barely peeps out of the ground, giving it a slight roseate or purplish tinge. To effect this, the shoots must be cut several inches under ground, and it would be utterly impossible to do this, were the roots to be planted at a depth of only two inches. And again, it is useless to expect to obtain large-sized succulent shoots from asparagus plants set only nine inches apart from each other. We might as well hope to raise large ears from corn planted at such small distances, and we Western farmers know very well that this can not be done. The roots of asparagus will radiate in all directions to a distance of at least six to eight feet from the crown of the plant, and it is obvious that a space of nine inches is insufficent to enable each plant to attain the development of which it is susceptible.

The difference of opinion as to the precise period of development the shoots should attain, to make them most palatable for culinary purposes, is a mere matter of taste and habit. As I stated before, the majority of consumers prefer them blanched, and of course we are compelled to adapt our mode of culture to the prevailing taste. For my own part, I prefer to eat asparagus somewhat green, as it has a more pronounced flavor, and for this purpose it must be allowed to grow a few inches above the ground. This is the way the French eat it, while the Germans and the Dutch prefer it blanched. As I said before, all this is a simple question of taste and habit.

Spring is considered the best season for setting out asparagus, though the work of planting might be done successfully in autumn. But in most of our soils the surface is apt to bake under the alternate influences of rain, frost and thaw; and it is important that the ground should be left as loose and mellow as comports with its nature. In our latitude the month of April is generally the best period in which to do this work, although I have successfully set out beds of asparagus as late as the middle of May—the peculiar succulence of the roots

of this plant rendering it less liable to injury from late planting than most other vegetables. I have known asparagus roots to retain their vitality after being thrown away in some corner, where they had remained for months, exposed to the sun and rain.

After the work of planting is completed, the surface of the land should be well pulverized and leveled with a sharp steel rake, and nothing more remains to be done during the first year, except to keep the ground loose and porous between the rows by frequent hoeings. That weeds must be carefully extirpated at all times need hardly be added.

The fall work is simple enough. When the first sharp frosts of autumn have turned the leaves yellow and sere, the stems or tops that have been allowed to grow at will during summer should be cut off close to the ground and burned.

Asparagus is an entirely hardy plant, and when set out at a depth of ten or twelve inches, as I have recommended, a covering of straw or coarse manure is not needed to protect it from the effects of frost, although this operation may possibly be useful in more northerly latitudes than ours. I have always left my beds entirely bare during winter, and have never known them to suffer in the slightest degree from this exposure. The practice of top-dressing asparagus beds in autumn I believe to be wasteful, as the ammonia and other fertilizing elements contained in the manure are liable to be evaporated in the atmosphere, or washed away by rains, without any benefit to the plants.

The subsequent treatment I bestow each year upon my asparagus beds, does not vary while the plantation continues in existence. As early as the soil admits of working in spring I give a dressing of two or three inches of light, well-rotted barn-yard manure, being careful to exclude coarse lumps or corn-stalks that might cause obstructions to the young shoots in their underground growth. This top-dressing is forked in as lightly as practicable, as it is important that the roots, which—as I have remarked in a previous part of this article—are ever inclined to seek the surface of the earth, should be disturbed as little as possible. A steel-pronged hoe is the most convenient tool for this operation, and generally superior to a blade-hoe, for all labor to be done about asparagus beds. This first work of the season ought always to be performed during March, and before the young shoots of asparagus begin to push forth, otherwise a considerable proportion of the earliest and most valuable shoots will be broken and destroyed. During summer, the ground is kept mellow and clear of weeds, by a frequent use of the hoe, and every fall the stems are cleared off, after they are withered, and carefully burned, to prevent the seed from shedding and springing up all over the beds.

GATHERING THE CROP.

In gathering the crop, I would recommend to abstain from cutting any of the young shoots during the second year following the

planting. I lay some stress upon this recommendation, for it must be borne in mind that in order to obtain a good set of vigorous and stocky plants that will last fifteen or twenty years, the top should be allowed to grow unchecked at the start, in order to encourage the formation of abundant roots. Even during the third year I cut my young plants somewhat sparingly—after that the plantation may be considered as fully established—and it is my practice to cut off every shoot that grows until the latter part of May or first of June, when a thorough culture is given to the beds, and the tops are allowed to grow up at will, without being again touched or interfered with during the season. The rule we have usually adopted is to cease cutting whenever the early peas become fit to use. I am convinced that one of the principal reasons why so many men are unsuccessful in asparagus culture is, because they do not know when to commence or to stop cutting the crop. The strain on the vitality is too severe, and the plants weaken and die in the course of a very few years, after producing small crops of feeble, spindling shoots.

SOIL.

The soil best suited to asparagus is an alluvial loam, such as is found in our river bottoms; but experience has satisfied me that with thorough culture and an abundance of manure, any ordinary soil, capable of growing corn or wheat, can be made to produce the finest of asparagus. My own beds, I may assert, without fear of being upbraided with much exaggeration, have produced as large and fine asparagus as any ever raised in the United States; and they are located on a rather heavy argillo-calcareous piece of land, possessing a soil of very moderate depth and fertility—such land as a New Jersey truck gardener, for instance, would pronounce entirely inferior for gardening purposes. I have read somewhere that the wild asparagus is commonly found growing in clay soils, showing that this variety of land is not uncongenial to our plant.

FERTILIZERS.

I have never had occasion to use, upon my asparagus beds, any kind of fertilizer except well-rotted stable and barn-yard manure. No doubt that the application of commercial fertilizers, such as guano and superphosphate of lime, will be found highly beneficial; but the prime cost of guano, in New York, added to expensive charges for transportation, places this fertilizer entirely beyond the reach of Western farmers. Superphosphates, and other so-called special or commercial manures, are now so extensively adulterated, and, I may add, so generally worthless, that the amount of benefit received from the application to our lands of these substances is not equal to their cost. Salt ought to be, I presume, extremely beneficial to asparagus, for no writer on the subject, that I ever consulted, fails to advise its

use; but for my part I must be allowed to state that its application upon my own beds has never been followed with perceptible beneficial results, and I have, in consequence, abandoned its use. It is said to be destructive to the wire-worm and other insects, sometimes troublesome to the roots. In Europe, where asparagus culture is certainly quite as well understood and practiced as it is here, I have never heard chloride of sodium recommended as a special fertilizer for asparagus, by a single practical gardener or horticultural writer, and I am constrained to say that, contrarily to the opinion currently received, I set but little value upon salt as a fertilizer.

NOXIOUS INSECTS.

The asparagus beetle, (*criocerus asparagi*,) the only insect which, so far as my information extends, is known to prey exclusively upon asparagus, and which, in some localities in the East, especially on Long Island, has injured the crop to such an extent as to cause the destruction of some plantations, has fortunately not appeared in the West as yet. It is, therefore, a subject I shall not examine practically here, but rather leave to the consideration of our State Entomologist, and other scientific men, who make entomology a special study.

THE QUESTION OF PROFIT.

In concluding this short paper on asparagus culture, which gives my own working experience in a condensed form, I may be expected to touch upon the question of profit; but on this score I confess that I am not disposed to have much to say. It is the simplest thing in the world to prepare a long and detailed account, by means of which you may compute, to a nicety, the various items of expenditures and receipts per acre, and manage to leave a large balance for net profits. But gardeners and farmers, who have been taught, by practical experience, that seasons and markets are uncertain, shake their heads at this sort of guess-work, and lay it all on the score of book-farming. It looks to them, for all the world, like counting chickens before they are hatched. So I will not mention the large sum an acre of well-planted and well-cultivated asparagus can bring in dollars and cents. I can truthfully say, however, that, from a pecuniary point of view, asparagus is, in all respects, one of the surest and most profitable crops we can cultivate. It is never injured by the vicissitudes of the seasons, and never fails to produce a good crop, if properly treated. It keeps well, can easily bear transportation to a distant market, and never fails to sell at remunerative prices.

I may resumé all it is important to say on the subject by reiterating that three things are needed to grow asparagus successfully, to-wit: *Plenty of manure; thorough cultivation; a good variety.*

ORIGIN AND PHYSIOLOGY OF VARIETIES.

BY J. F. WIELANDY.

Notwithstanding the immense progress made in the pursuit of natural sciences since the early part of the eighteenth century, it is scarcely hazardous to assert that many of the most important laws that control the physiology of vegetables are yet but imperfectly understood by men of science, while, to the great mass of humanity, they remain, comparatively speaking, a sealed book.

But few people, I may instance, are aware that the popular varieties of fruit sold in profusion in all our markets were, without a single exception, once seedlings, and that the numerous trees producing our favorite standard varieties of apples and peaches are each but the continuation and extension, by graft or bud, of a single tree, originally found growing from a seed sprung up by accident, or planted by the hand of man. Take, for example, the Bartlett pear, a fruit as well known, perhaps, and more extensively cultivated in America and Europe than any other single variety of the *Pyrus communis*—a tree of which hundreds of thousands of individuals now exist on separate roots. All of these, without a single exception, are descended from one pip that grew up in or about the year 1796, in the garden of one Wheeler, a school-master living in the little village of Aldermaston, in the county of Berks, England. Its excellent qualities induced its rapid propagation both in England and on the continent of Europe, where it is known by the name of Bon-Chretien Williams, while in this country it is known under the name of its first importer, Enoch Bartlett, of Dorchester, Mass. The innumerable Bartlett pear trees now existing everywhere are, in reality, but an extension on distinct and separate roots of the Aldermaston tree. Every other variety of fruit enumerated in the works of pomologists or the catalogues of nurserymen has originated in a similar manner.

Our fruit trees are the artificial products of culture, and while their seedlings manifest a constant disposition to improve, or at least

to sport, they exhibit at the same time a stronger disposition to return to the original wild type. The great majority of fruits we possess thus far are the result of sport or chance cross-impregnation—the pollen of one flower being carried to the pistil of another by the winds, bees, insects, or other fortuitous causes. It is well to note here that hybrids must not be confounded with cross-breds or sports. Hybrids are the produce of an intermixture of two different species; cross-breeds occur through the mixing of distinct individuals of the same family, or, more properly, variety. Sports are the result of the tendency inherent in all plants to vary more or less from the original type, through the effects of culture or other causes inappreciable to human observation. True hybrids are said to have originated among some of our cultivated varieties of fruit, though I am constrained to admit that no well-authenticated instances of such intermixing have occurred within my own experience.

The apple and pear, for instance, belong to two closely related families of the genus *Rosaceæ*, yet no hybrids have ever occurred between them, and neither will live for any length of time when engrafted upon the other; while the pear thrives very well upon the quince, a tree less closely related to it than is the apple. Yet singular to say, it is stated that the quince grows with difficulty on the roots of the pear, while the pear grows very freely on quince roots. Again, while the peach and plum—two equally closely related plants of the same genus, *Rosa*—seem incapable of producing hybrids, each will grow and fruit freely and abundantly when budded on the other—the plum, especially, being used almost exclusively in Europe as a stock for growing peach trees.

I apprehend that many freaks and vagaries noticeable in vegetable physiology will never be satisfactorily accounted for by human science.

The creation of new varieties from seed has been the subject of many speculative theories, none of which can be said to insure an absolute certainty of success. Among these various theories the methods advocated by Van Mons and Knight are deserving of a more extended mention.

Van Mons, a celebrated Belgian professor of natural sciences, was born in Brussels, in the year 1765, and died in the city of Louvain on the 6th of September, 1842. He was a man endowed with eminent gifts of the heart and mind, and passionately fond of horticulture. Being possessed of ample means, he founded, first in Brussels and subsequently in Louvain, an experimental nursery, in which, at one time, he had collected over 80,000 young seedling pear trees, not with an eye to profit—for he freely gave away scions and trees—but in the hope of gaining valuable new varieties of pears. His theory consisted in starting with seed procured from wildlings, and he held that by constantly selecting seed from those trees showing the greatest improvement over the original wild type, in their fruit and habits of growth,

and reproducing seedlings from seedlings in succession, highly improved varieties must be the result after a certain number of generations. But this method, while it requires a life-time to effect substantial results, does not seem to have accomplished all that Van Mons claimed and expected from it.

Thomas Andrew Knight, a distinguished English horticulturist, advocated artificial cross-fertilization as a means to insure the production of new varieties, and it can not be denied that his theory bears an appearance of plausibility and sound reasoning. Knight's method has met with numerous adherents in our own country, some well-known writers going so far as to assert that "it gives the grower the choice of selecting and growing to whatever form, size or character he may desire, and this with an almost absolute certainty of success."

So sweeping an assertion is very far from being warranted by the results of practical experience. While admitting the principle as correct theoretically, we must not flatter ourselves that we are able, by the aid of artificial manipulations, to produce as many new varieties as we may desire, and especially varieties with qualities we can ourselves predetermine when we create them. Nature has hidden secrets that man can not penetrate at will, and, after futile efforts, he finds himself compelled to admit that new species or varieties originate with such qualities as it pleases nature to endow them with, and that his share of influence in their creation is but secondary, at best. At the same time, the inferences we can deduct from many experiments indicate clearly that an intelligent course of hybridizing, crossing, or special selection of seed, greatly increases the probabilities of ultimate improvement, and that when seed is planted promiscuously, the chances for the introduction of valuable seedlings are very remote, the progressive tendency to amelioration only exhibiting itself at rare intervals.

Of the many natural seedlings and hybrids, or cross-breeds between native and foreign varieties of the grape, produced by John Fisk Allen and Edward S. Rogers, of Salem, Mass., George W. Campbell, of Delaware, Ohio, and other experimentists, by far the greater majority were discarded as being worthless, and a comparatively small number may be ranked as valuable acquisitions.

Andre Leroy, the celebrated writer on pomology, and nurseryman of Angers, France, states in the introductory chapters that precede his *Dictionnaire de Pomologie*, that for fifty years he has grown millions of pear seedlings for nursery purposes, the seed being generally procured miscellaneously from inferior kinds of pears used for the fabrication of cider or perry, a very common beverage in France. He made it a practice each year to select from among these a certain number of the most promising young seedlings, and to graft them on the quince, in order to hasten fructification. A portion would begin to bear fruit at the age of five or six years, while others required ten

or twelve years before they became productive of fruit. Not one of these seedlings ever bore pears worthy of being propagated. Mr. Leroy made other experiments with seed saved with great care from his choicest varieties, and succeeded much better with the latter class of seedlings, having obtained, as he states, and still gaining annually, new varieties of great beauty and excellence. But even among the latter class, all the trees did not prove worthy of culture—in fact, by far the greater proportion turned out mediocre or entirely bad.

Prof. Kirtland's experiments with seedling cherries show similar results. From several hundred young seedlings, grown from seed gathered from the same tree, only about one-tenth have surpassed, and two-tenths equaled, the parent—the remainder mostly falling back toward the original Mazzard type. Prof. Kirtland proved a very successful experimenter, his valuable gains considerably exceeding the usual proportion.

As the following will show, chance enters for a great deal in the obtainment of new sorts. Mr. Albert Brezee, of Vermont, originated, it is said, in 1862, from the seed saved from one single boll of the Garnet Chili, several extremely valuable new kinds of potatoes, which include the Early Rose and the Peerless, sorts now well known and extensively cultivated throughout the United States. The Early Rose, like many highly improved varieties of the potato, bears seed very shyly; but accidentally, two years ago, I found four or five ripe bolls of this variety on some of my vines, which I concluded to save and sow for the sake of experiment. A year or two previous I had already raised in the same manner a number of seedlings, from seed of the Early Goodrich potato. The Goodrich seedlings resembled the parent in color, shape and general appearance, but proved inferior, and were all discarded. The Early Rose seedlings present a much greater diversity in appearance, some of the tubers growing round, others long; some being white in color, others pink, purple, yellowish, etc.; but none equal the parent in earliness, while but two or three seem likely to surpass it in point of quality and productiveness. Many thousand potato seedlings will doubtless have to be raised before one is found to excel the Early Rose in the combined points of earliness, productiveness and quality.

I may add that among a considerable number of seedlings from the apple, peach, quince, grape, gooseberry, blackberry and other garden trees and shrubs, allowed to grow up and bear in order to test their fruit, by myself and one or two friends, who take an interest in such experiments, not one has been found worthy of propagation thus far.

Many additional facts could be adduced in elucidation of the views here expressed, but this may be deemed superfluous. I shall, therefore, sum up my experiences on the subject I have endeavored to treat in this article, in the following manner:

First—The law of selection advocated by Darwin and other distinguished scientists holds good with our garden varieties of fruits and vegetables, as it does with every other branch of animate and vegetative creation. New varieties originate by fortuitous natural selection, as sports and crosses, or less frequently through the agency of human intelligence, as cross-breeds, and very rarely as true hybrids.

Second—In order to gain a few meritorious fruits, it is necessary to raise a large number of seedlings.

Third—New varieties combining every desirable quality are rare exceptions we ought to esteem ourselves fortunate to meet occasionally, while the proportion of inferior or worthless seedlings is infinitely more considerable.

Lastly, all experiments tend to prove that in growing natural seedlings, as well as artificial hybrids and cross-breeds, the chances of producing improved varieties are much greater when the seed is carefully selected from fruit possessing unusual excellence, than when it is taken promiscuously from inferior varieties or wildlings.

PROSPECTS OF THE NATIVE WINE TRADE.

BY ISIDOR BUSH.

In considering the prospects of any article of trade, it is of first importance to know whether it is one of permanent use, the consumption of which will be constant or, but temporary; whether the demand for the same will increase or diminish.

Wines are generally considered an article of luxury, but they fill a want of human society; they are at least as necessary as coffee, tea and tobacco—and thus form one of the most important articles of trade.

Let the zealot, the short-sighted and the ignorant, declaim or preach or legislate against the use of wine, and fermented liquors in general, they will and must do it in vain. They may try to prohibit and to decry them as poisons even, much as they please: man feels that "wine gladdens the heart," that it warmeth his blood, stimulates his activity, increases his joy; and the more man elevates himself above the brute the less he can feel satisfied with merely stuffing his stomach with food.

Say what you may, man needs fermented or alcoholic liquors to enhance his cheerfulness, as well as narcotics to soothe his sorrow—and he *will have them;* and nature has provided them, therefore, at all times and in all climates all over the world. The Indian of South America will honor his guest with "chica" (corn chewed and fermented in pumpkins;) the inhabitant of the Friendship Islands makes wine from the "Kawa-root;" the Arabs and Tartarians make a spirituous liquor from millet; the shepherd of Himalaya sips his "murwa;" the Russian his "quass." The palms of the coast of Africa (*Caryota urens*) yield abundantly the real "toddy." From the cocoa-nut palm floweth the "karaka," and the "quarago" from the sugar-cane. From all kinds of fruit some vinous liquor is made; nay, milk even is turned by peculiar treatment into an alcoholic beverage.

But of all, the grape furnishes the best, the most refined and most wholesome stimulant—the wine;* and wherever the grape has been successfully raised, its juice has supplanted the use of all other alcoholic liquors.

It is not within the scope of a short essay to give in evidence many statistical data; nor are figures always conclusive evidence. Any one who has traveled through Europe knows, without referring to figures, that England and Ireland consume by far more brandy and whisky than France and Italy; that in Poland, north of the Karpathian hills, more fire-water is drank than south of the Karpats, in Hungary. By some, the statistical records of other countries may not be admitted as sufficient proof of our own; and in this country reliable figures, showing the annual increase in the production and consumption of wines, are not even attainable. (The United States Report of Agriculture, in showing the products of each principal crop, gives us the statistics of tobacco but not of wine.)

It is, however, sufficiently known to all of you, grape-growers, that the production of wine has of late largely and most rapidly increased; and the last reports from the United States Internal Revenue office show a large and continual decrease in the production of distilled liquors.

We produced in 1870 about 60,000,000 gallons of whisky, and thus there is yet ample room for increase in our wine production before we can furnish enough to take the place of the former, as we hope it will, though it may take many years; for we must remember that habits are but slowly acquired, and still more slowly changed. And here we are led to the consideration of another question bearing on the prospects of native wines: Will they take the place of foreign wines? Will the Catawba, Delaware or Herbemont supplant the Sauterne or Hock wines? Will the Concord or Ives take the place of Claret? or the Norton's or Cynthiana that of the Port or Burgundy? and will our wines ever be exported? Many of the cultivators and lovers of grapes believe they will, and clamor for high import duties to hasten the good time which they hope is coming. The drinkers and lovers of foreign wines, on the contrary, just as firmly dispute it. They may occasionally, from politeness, accord to our wines a qualified praise, but they will not drink, much less buy it. Generally, they will only condescend to yield that in many, many years, when they themselves will be sure to use none, our American wines may attain that perfection, may lose what they deem an unpleasant, earthy taste, so as to replace or equal their beloved Sauternes, Medocs or Bordeaux, if they are Frenchmen; their Ruedesheim or Assmann-

*Testimony like the following will scarcely be gainsaid: "Wine as a restorative, as the means of refreshment when the powers of life are exhausted; of giving animation and energy where man has to struggle with days of sorrow; as a means of correction and compensation when misproportion occurs in nutrition, and the organism is deranged in its operations; and as a means of protection against transient organic disturbance—is surpassed by no product of nature or of art."—*Liebig.*

hæuser, if Germans from the Rhine; their Deidesheim or Ober Ingolsheim, if Germans of the Pfalz; their Ruster or Erlaner, if Hungarians; their Xeres or Port, if Spaniards or Portuguese; their Lacrimæ Christi, if Italians; or their Cyper wine, if from Greece. Who, then, is right?

To arrive at the correct conclusion, that "tastes are governed by habits," you need only to consider that, while all the civilized world admit of the great excellence of all the above named wines, the French do not consume and even dislike the finest German wines; that the Germans have the same preference for their Rhine and Pfalz wines; and that, in fact, all nations drink their home production, except where they have none; and these, then, always prefer the wine from those countries with whom they are in close, easy commercial connections. Thus it is, that at Hamburg, though a thorough German city, but in regular daily communication with Havre and other French ports, French wines are generally used and preferred. In England, before the revolution of 1688, none but French wines were used; and although the introduction of Portuguese wines was favored by special treaties, and immense import duties were then placed upon French wines, it required more than a hundred years, and all the hatred of the English people against the French and all products of France, before the Port wine supplanted the Bordeaux; and now, wines from Spain and Portugal predominate in England up to this day.

We love what we are used to. Those used to certain foreign wines will ever prefer these, and, if their means permit, will purchase them, regardless of prices, in preference to our native or any other wines. No doubt prejudice has also much to do with it—there are many who know a wine only by its label. But prejudice is like dust: you can not keep it out.

The importation of foreign wines into the United States has therefore increased so far with the increase of immigration, and with the accumulation of wealth among the industrious emigrants, and willl continue to do so.

The importations of foreign wines at the port of New York, from January 1 to November 30, compare as follows:

	1871. Gallons.	1870. Gallons.	1869. Gallons.
From Bordeaux	778,415	493,750	512,900
Ceuta and Marseilles	2,378,860	2,241,000	1,341,300
Germany	1,615,800	1,235,900	1,356,500
Total dutiable value of wines and champagne imported during same time	$3,679,399	$3,208,012	$2,837,761

This need not discourage us, however. With the increased quantity, the improved quality and cheapness of our home production, especially in the last few years, our native population, the children of

our immigrants—nay, even that larger number of immigrants themselves, who could not afford to drink wine in their Fatherland—will all soon get used to, and will love and consume, our native wines above all others.

The almost total failure of European vineyards this last season, yielding scarce sufficient for home consumption, and that a wine of inferior quality only, will also come to our aid.

The probabilities, or improbabilities, of our exporting American wines, scarcely merit consideration. For even the exportation of France, which exports more wine than any other country, never exceeded five per cent. of its production. France produces in ordinary seasons about 990,000,000 gallons of wine, of which about 43,000,000 gallons are exported—only four millions of these to the United States.

By improving our commercial relations with the Canadas, Mexico and other non-wine-producing countries, we may, at some future day, also acquire a considerable export for our wines; but to the old wine-producing countries of Europe we will export but very little, as an article of curiosity.† The same reasons which operate against native wines replacing here the use of foreign wines, operate still more strongly against their exportation, aside even from our being unable to compete in price with the ordinary European wines. Our main reliance for the sale of our wines must be placed on our home consumption only.

How large this home consumption may become, can only be conjectured from the home consumption of other countries. France, with a population of 37,000,000 inhabitants, (including Alsace and Lorraine,) used to consume, annually, about 900,000,000 gallons; but it would be folly to expect a similar consumption of American wines within our own, or even the next few generations.

Germany, with scarcely less population, consumes only about 45,000,000 gallons; and this has been a wine-producing and consuming country for nearly a thousand years.

It would be no less absurd to conjecture the quantity of wine likely to be produced here, from the area which may be adapted to its growth. Some, otherwise able writers about the resources of Missouri, have claimed for her millions of acres suitable to grape culture, and were predicting therefrom a production of wine surpassing that of France even.

Missouri now produces about 1,000,000 gallons; Illinois probably about 1,250,000 gallons; Ohio, embracing the islands in Lake Erie and the Lake Shore, 3,000,000 gallons; New York, mostly in Steuben county, and made into sparkling wines, 2,250,000 gallons; all the other States east of the Rocky Mountains, scarcely 1,000,000 gallons; California alone, over 7,000,000 gallons.

† In 1868 we exported 27,070 gallons of wine, and part of this small quantity was not native wine.

Considering that the production of American wines is yet in its infancy, we must all admit that it has grown rapidly to pretty big proportions;‡ and it is evident that the consumption of them has increased in the same ratio, for there is scarcely any native wine more than one year old to be found anywhere; even in California the stock of old wines is but small—dry white wines, older than the vintage of 1870, being particularly scarce.

The question which next presents itself, and greatly influences production in the future, is: Will it pay? In an article lately published in the Missouri Republican, by one Mr. L. C. Waite, intended to be read before the Bee-Keepers' Association, it is said that, "The question of profit has become, in this nineteeenth century, the all-absorbing one. Profit is the main-spring that holds in place, and keeps in motion, the machinery of the world. It is the main-spring of *all* our actions."

Woe, if this were true; woe, if all our actions, from the cradle to the grave, were not inspired and prompted by nobler, purer motives; if love and gratitude; if honor and the desire to do good; if search of truth and knowledge, nay, of pleasure — were no more among the motives of human actions, and if profit, the desire for gain, were the main-spring of all our actions. Fortunately this is, and ever will be, untrue; fortunately, our people—even the people of New York—have repudiated the men who acted on such doctrines; fortunately, our grape-growers, as a class, do not subscribe to them. But no one disputes that the profits are desirable, and necessary as a means of self-preservation; and it is a proper question, in considering the future prospects of a branch of industry and commerce, whether it will pay.

Now, eminent national economists have shown that the money value of an article, whatsoever it be, is equal to the cost of labor which its production required; its exchangeable value (or price) varies, however, in proportion to its supply and demand. If the supply is in excess of the demand, the price will fall below the cost of production, and consequently its production will cease, or diminish, until—if the article is at all wanted—the supply will so decrease that the demand will again exceed the supply, the price advance until it again exceeds the cost, and consequently again encourages production as long as the usual average profit can be obtained. These economists have also well established the fact that this average profit in any country is clearly expressed by the ruling interest paid on capital. Thus it may well and safely be assumed that every article for which

‡ These figures are merely estimates; but they are made after careful consideration of all attainable facts, and may be relied upon as nearer correct than any other—even official exhibits—so far published. The Department of Agriculture, in its report for 1868, has published tables, as "contributions toward a complete collection of vineyard statistics," attempting to give the number of acres then planted in vineyards by States and counties. But how very incomplete the returns therein presented are, will appear from the table of Missouri, in which the counties of Cooper, (Boonville,) Franklin, (Washington,) St. Charles, (Augusta,) Ste. Genevieve, Warren, etc. are entirely overlooked. The tables of other States are just as incomplete.

there is a proper constant demand will — except while the supply may be temporarily in excess of the demand — pay a fair profit, and that excessive gains can not be obtained in the long run on any article, unless its production be a monopoly, either by privileges conferred by law (letters patent) or by being a secret known to but few.

Grape-growing, like all agricultural pursuits, can not be a monopoly; we all know that even the originator of a new variety can not obtain a patent. Nor can the manufacture of wine, known since Father Noah's time, be considered a secret; and though many of our grape-growers are as yet inexperienced in the manufacture of wine, (and some may have spoiled the first pressing,) they will all soon learn to make good wine, especially if they beware of those who pretend to possess "secrets" about its treatment.

The manufacture of sparkling wines, and of certain liquor wines, is yet, to some extent, a secret, or rather, known to but few experts; it requires, besides, large capital — and it is, therefore, in this branch of the wine business, mainly, that very large profits are, and may yet be, made for some time in this country, whose people are specially partial to sparkling wines.

Wine possesses, moreover, in so far the character or advantages of a monopoly, as but few favored localities are adapted to produce it with that high degree of perfection which makes wine particularly valuable. Unfortunately, we, the pioneers of the American wine trade, labor yet under that great difficulty: that the tastes of our wine-consumers are not sufficiently cultivated to make a proper and sufficient distinction between a common and a very superior article. If common Catawba is sold at $1 per gallon, $1.50 would be considered a very high price for a choice, superior Catawba, and $2 per gallon an exorbitant figure, which could not be obtained for a large quantity; while in foreign wines, a superior article will command — even in its own country — three and four times the price of ordinary wines of the the same vintage and kind.

That here, also, a better and more appreciative distinction will be made before long, we can not doubt; and that it is not already done may partly be ascribed to the fact that, until lately, the price of common native wines has been too high. It will and must be lower than at present even; wine must be as cheap as beer or milk before it can become the favorite drink of the people. Then only will we have true lovers of native wine; and the rich and opulent will pay for a choice Cynthiana, Herbemont or Louisiana, if not as fabulous prices as are recorded for some Johannisberg and Tokay, yet more than we can now obtain.

This may not be a satisfactory prospect; it may be especially unpleasant to those who consider grape-growing already unprofitable at present prices, and who are unwilling to bestow extra care, and to wait, but nevertheless it is so. The history of all wine countries relates that there were once seasons of abundant crops, when the

vintners filled one cask with delicious must, in exchange for another empty one. In all of them the price for good ordinary young wines does not exceed, on an average, from 15 to 25 cents per gallon. True, laber is cheaper there, but their vineyards require more labor. They plant in Europe mostly 3,000 vines to the acre, which must be pruned and tied, and often manured; and 300 gallons to the acre is considered a very good yield. Even in California, the price of young wine is now from 25 to 35 cents per gallon only; the price of grapes ranges from 65 cents to $1 only per 100 pounds, and yet they claim that it pays a good return. True, the yield there is very large, and the cost less than here, on account of there being no rain from June to November, and consequently no trellising is needed—no weeds to contend with. Moreover, the California wines, at least the majority of them, (from the Mission grape,) lack acidity and character, contain too much alcohol, and do not find favor with our people. Yet all these facts show that we also will come to lower prices.

We produce about 500 gallons of wine per acre; this, at 40 cents, makes $200, which is a fair return to industrious and economical grape-growers, over and above cost of cultivation and interest on the outlay. It will not pay to those who plant and cultivate vineyards with hired labor, unless they manage very carefully, cultivate the best varieties, and give the closest attention to the production of very superior wine, which, if they wait patiently, will finally command very good prices—better than at present. Besides, it is a pleasure and a pride to be the possessor of a fine vineyard, and to own cellars filled with choice wines, worthy of the noblest and the richest of the land, who may also take into consideration that grape-growing possesses the further advantage to make land valuable which is but little adapted to the cultivation of grains, and that it adds value to the surrounding lands—to such even as have been formerly rated as worthless and unfit for cultivation.

Thus, we need not apprehend that grape-growing will be abandoned to a large extent. While some, disappointed in their high expectations of profit, based on visionary calculations, will quit grape-growing, and will sell their vineyards—others, better fitted, will take them in hand, and hundreds will join them, until the thousand hills surrounding the Mississippi Valley will be clad with grape-vines; and St. Louis, its great center, will be another Bordeaux, distributing their heavenly juice to all. Then you will find that native wines will sell readily.

ADDRESS

OF THE

ST. LOUIS TOBACCO ASSOCIATION

AND

LIST OF PREMIUMS

OFFERED TO THE PLANTERS OF THE WEST FOR THE CROP OF 1872.

[Believing that the Address of the Tobacco Association of St. Louis, and List of Premiums offered to the planters of the West for the crop of 1872, can not fail to prove of great interest to the tobacco growers of Missouri, the Corresponding Secretary deems it proper to republish said address in the Annual Report, and invites the attention of the public to the list of valuable premiums given by the Association for the crop grown in 1872, amounting in the aggregate to over ten thousand dollars. J. F. W.]

TO THE FARMERS OF THE WEST.

"The Tobacco Association of St. Louis," recently organized under the General Laws of the State of Missouri, and composed of the dealers, manufacturers and factors of tobacco in St. Louis, in laying before the farmers of this and adjoining States the list of premiums which they have resolved to offer for the crop of tobacco grown in 1872, take this occasion to bring to their attention the object of this movement, and the importance of the tobacco trade of the West.

The offering to the country of so magnificent a premium list, exceeding in amount any premiums ever before extended for any product of the farmer, might of itself be sufficient to exhibit the sincerity of the members of this Association, and the importance to the trade of the country of this article. Yet it is their desire to express their confidence in the value and advantage to the farmers of the West, as well as to the trade of the country, of a more general cultivation of tobacco.

It is well known to those who have examined the statistics of our Agricultural Bureau, covering the last twenty years, that tobacco has been the only important staple production of this country which has fallen off; yet it is true that from 1850 to 1860 the average production of tobacco in the United States exceeded the average production from 1860 to 1870. The cause usually assigned for this decrease of production of an article of universal demand, and for which so large a portion of our soil is so well adapted, is the change of the system of labor usually and heretofore employed in the older tobacco-growing States. We find, however, in our neighboring States of Illinois and Ohio, as well as in Connecticut, Wisconsin and other Northern States, the cultivation of tobacco has steadily increased, and sections of country, but recently devoted to its culture, now largely surpassing old tobacco States in the extent of their production; and when we reflect that the cultivation of tobacco, from its planting to its maturity, may all be conducted by light labor—that a boy twelve years old may conduct a crop through all its stages—we must find some other reason for the indifference of the farmer in regard to this crop. We think this may be found in the more liberal

prices realized during the last ten years for other productions—for corn, wheat and other grain, and for cattle and hogs; the very remunerative prices for all these have induced the farmer to abandon his old "tobacco crop" when its production required a change of labor and a different arrangement of crops.

But we now see that the area of grain territory is so large that the improvement and multiplication of labor-saving machinery has so lightened its production that they are not able to realize the high prices of a few years ago; that only from the result of the late war in France, and a partial failure in European crops, are they enabled to realize the present prevailing prices for grain; that even with these occurrences, (fortunate for this country,) the price of corn will scarcely pay for its production, and from many sections of our State will not bear transportation to the commercial centers of the country. It is evident to any one who will consider the increased supply of cereals in this country, and the sources from which we expect our principal demand, that with good crops in this country and good crops in Europe, which may be expected—for failure in either is the exception—the present prices of cereals will not be maintained; and the same may be said of the prices of cattle and hogs.

Now, in tobacco, we find that the total production in the United States has decreased in the last ten years, and at the same time there is an increased home and foreign demand, the latter having been supplied to a great extent by substitutes, which will be readily given up when a full supply of substantial American tobacco will fully meet the wants of the Old World. Is it not, therefore, fair for us to conclude that the crop should be most encouraged which is most neglected and in the best relative demand, and that farmers and dealers may most safely calculate for fair and remunerative prices for that production, the supply of which falls farthest from meeting the wants of the world?

We believe that farmers can safely rely upon good prices for their tobacco, and sufficient confidence is felt by this Association, of a steady demand at remunerative prices, to warrant them in urging upon the planters of the West its increased cultivation.

It is well known that no State in our Union can produce tobacco surpassing, in qualities most desirable for home manufacture or exportation, the product of our own State. Its soil is adapted to the cultivation of every quality of leaf; and while some sections are more favorably adapted to the cultivation of manufacturing grades, or such as are used in plug chewing tobacco, other sections can produce bright cutting leaf—a tobacco which will always pay the farmer better than any other grade—and still other sections can produce a heavy leaf, suitable, and in large demand, for exportation; and it is believed that there is not a county in the State, in which its cultivation can not be successfully conducted to a greater or less extent.

We would urge farmers who have not heretofore grown tobacco to make the experiment of a few acres the coming year, in addition to their usual crop of cereals, and they will find themselves amply rewarded in a liberal yield of their soil, and would be adopting a prudent system in the diversity of their crops. We do not advise farmers to leave off the production of cereals, or to bestow an undue or exclusive attention upon any one article. In no section of our country is this course safe; but a diversity of crops, or of productions, where the soil is so peculiarly adapted to a variety of productions, is a safe, prudent and wise course for the farmer.

This Association announces, at this early day, to the country, this premium list for the crop of 1872, in order to give ample time to those heretofore engaged in its cultivation and familiar with its handling to consider, during the leisure hours of winter, the importance of directing their labor and attention to its increased cultivation, and to induce those not heretofore engaged in its cultivation to turn their attention in this direction, and introduce it as a permanent crop, and by inquiry and investigation to become acquainted with the manner of its culture.

We have endeavored to so arrange the premiums offered as to bring some of them within the reach of every farmer, and have included all qualities which it has been found can be produced successfully in the Western States. The exact date of the exhibition, which it is provided shall be held in this city, in 1873, will be made known during the early part of that year. It is desired that it shall be as early as possible, to suitably prepare the crop of 1872 for market.

This Association is collecting full and complete statistical information of the trade of the country, and of all other matters which may be of value to the planters in the West, and will be glad to furnish them information in regard to the trade, and of the manner of cultivating, curing and handling tobacco, and of the qualities most desirable to produce in different sections of this or adjoining States, and would solicit from planters of the West any information in regard to crops in their sections, as well as suggestions in regard to the production of tobacco.

It is our sincere desire that the movement which we have inaugurated may result in great advantage to the trade, and to the planting interest of the West, and that the liberal rewards offered by this Association may be met by a like liberal effort on the part of planters; and that our State especially, rapidly stepping to the front in all the enterprising movements of the day, may not leave undeveloped this important branch of agriculture.

Good tobacco seed will be furnished to planters upon applying to this association. JNO. E. LIGGETT, *President.*

JNO. F. WEBBER, *Secretary.*

St. Louis, Mo., December 26, 1871.

GRAND

PREMIUM TOBACCO FAIR,

ST. LOUIS, MO., JUNE, 1873.

TOTAL CASH PREMIUMS, $10,125.

The "Tobacco Association of St. Louis," with the view of encouraging the increased culture of tobacco in the West, and to reward those whose honest effort shall aid in promoting the full development of this important article of commerce, have concluded to offer the premiums enumerated herewith, and amounting to over *ten thousand dollars*, for the crop grown in 1872—the award of these premiums to be made at a grand exhibition, to be held in St. Louis in June, 1873, under the control and direction of this Association.

This exhibition and sale, in 1873, of the crop of 1872, will doubtless be the largest and most successful ever held in the United States; and the planters, manufacturers and dealers in tobacco throughout the West, and others interested in promoting this important branch of trade, are cordially invited to an earnest co-operation in the efforts inaugurated by this Association.

PREMIUM SCHEDULE.

FIRST CLASS.

DRY SHIPPING TOBACCO.

1.	For the best crop, (quality and handling considered,) of not less than 15 hhds., suitable for exportation, the same being the entire product of one planter	$1,000 00
2.	For the best crop of one planter, (conditions as first,) of not less than 9 nor more than 15 hdds	700 00
3.	For the best crop of one planter, (conditions as first,) of not less than 6 nor more than 9 hhds	500 00
4.	For the best crop of one planter, (conditions as first,) of not less than 4 nor more than 6 hhds	300 00

NOTE.—All tobacco offered in this class must be well assorted, neatly tied, sweet and thoroughly dried, and prised in hhds. of not less than 1,200 lbs. net.

SECOND CLASS.

MEDIUM MANUFACTURING.

1.	For the best crop of not less than 10 hhds., the same being the entire product of one planter	$1,000 00
2.	For the best crop of not less than 7 nor more than 10 hhds., the same being the entire product of one planter	700 00
3.	For the best crop of not less than 5 nor more than 7 hhds., the same being the entire product of one planter	500 00
4.	For the best crop of not less than 2 nor more than 5 hhds., the same being the entire product of one planter	300 00

NOTE TO SECOND CLASS.—It is understood that no crop shall be excluded from competition in this class on account of its being partly bright, red or mottled. All offerings in this class shall be neatly prised in hhds., and shall weigh not less than 1,000 lbs. net.

THIRD CLASS.

BRIGHT MANUFACTURING.

1.	For the best crop of not less than 5,000 lbs., the same being the entire product of one planter	$1,000 00
2.	For the best crop of not less than 3,000 lbs., nor more than 5,000 lbs., the same being the entire product of one planter	500 00
3.	For the best crop of not less than 1,000 lbs., nor more than 3,000 lbs., the same being the entire product of one planter	300 00

FOURTH CLASS.

CUTTING LEAF.

1. For the best crop of not less than 3,000 lbs	$300 00
2. For the best crop of not less than 1,000 lbs. nor more than 3,000 lbs	200 00

FIFTH CLASS.

PLANTERS' SWEEPSTAKE.

For the largest crop raised by one planter	$1,000 00

SIXTH CLASS.

For the best hhd. manufacturing leaf, weighing not less than 400 lbs. net	$200 00
For the second best hhd. manufacturing leaf, weighing not less than 400 lbs. net	100 00
For the third best hhd. manufacturing leaf, weighing not less than 400 lbs. net.	50 00

SEVENTH CLASS.

For the best hhd. factory dried leaf, weighing not less than 1,200 lbs. net	$100 00
For the second best hhd. factory dried leaf, weighing not less than 1,200 lbs. net	50 00
For the third best hhd. factory dried leaf, weighing not less than 1,200 lbs. net	25 00

EIGHTH CLASS.

For the best hhd. cutting leaf, weighing not less than 800 lbs. net	$100 00
For the second best hhd. cutting leaf, weighing not less than 800 lbs. net	50 00
For 5 hhds. best cutting leaf, offered by one party	100 00
For 5 hhds. second best cutting leaf, offered by one party	50 00

NINTH CLASS.

For the best hhd. black wrappers, weighing not less than 950 lbs	$100 00
For the second best hhd. black wrappers, weighing not less than 950 lbs	50 00

TENTH CLASS.

For 5 hhds. best factory dried leaf, quality and handling considered	$150 00
For 5 hhds. second best factory dried leaf, quality and handling considered	100 00

ELEVENTH CLASS.

To the party shipping to this market, and having same sold on the breaks, the largest number of hhds. of tobacco during the year 1872, (the premium to be awarded at the premium sale in 1873)	$500 00

Entries for competition in classes 1, 2, 3, 4 and 5 open only to tobacco produced in Missouri, Kansas and Illinois.

Eentries for competition in classes 6 and 7 open to planters only, from any State.

Entries in classes 8, 9, 10 and 11 open to general competition.

All tobacco offered must be of fair quality and in good merchantable order, and in classes 1, 2, 3, 4 and 5 must be accompanied with satisfactory evidence that the tobacco entered is the entire crop of the party offering.

No tobacco contending for any of the above premiums shall be exhibited in boxes, except such remnant of crops as it may be found impracticable to prize in hhds., and no more than one box of such remnant shall be allowed to each or any crop.

All tobacco contending for any of the above premiums shall be exhibited at St. Louis, Mo., under the direction of this Association, at a fair to be held in June, 1873.

Any information or particulars in relation to this premium list, or the proposed exhibition, will be cheerfully given by application to the Secretary of this Association.

JNO. E. LIGGETT, *President.*

JNO. F. WEBBER, *Secretary.*

St. Louis, Mo., December 26, 1871.

THE TOBACCO ASSOCIATION OF ST. LOUIS.

OFFICERS FOR 1872.

PRESIDENT.

JOHN E. LIGGETT.

VICE-PRESIDENT.

WEB. M. SAMUEL.

DIRECTORS.

WM. M. LADD, SAMUEL PELTZ,
JNO. N. BOOTH, PATRICK KELLER,
CHRISTIAN PEPER, DANIEL CATLIN,
JAMES A. GREGORY.

COMMITTEE OF ARBITRATION.

S. M. BROWN, G. W. SEE,
JOSEPH BOYCE, A. GUYE,
C. A. LAWTON.

COMMITTEE OF APPEALS.

J. W. BOOTH, CRAIG ALEXANDER,
J. E. HAYNES, J. L. THOMPSON,
N. M. BELL.

SECRETARY.
J. F. WEBBER.

TREASURER.
CHAS. DORMITZER.

FOURTH ANNUAL EXPOSITION

OF THE

ST. LOUIS TOBACCO ASSOCIATION.

JUNE, 1871.

The fourth annual tobacco fair of St. Louis was held at the Peper warehouse, on Market street, and although not so numerously attended as last year's fair, was, in some respects, more successful. The premiums offered amounted to $2,000, exceeding the aggregate of last year's prizes by $450, and the number of entries, also, was larger, reaching a total of 177 hhds. The greater part of the tobacco exhibited was from Virginia, Kentucky and Missouri, and among the entries were several very fine specimens. Some of the Kentucky leaves were remarkable for their size. Among the Missouri entries were quite a number of excellent lots.

Before giving a detailed account of the fair, some particulars respecting tobacco culture will not be out of place.

TOBACCO CULTURE IN MISSOURI.

The culture of tobacco has always formed one of the most important of the agricultural interests of Missouri, but was more disastrously affected by the late civil war than that of any of the other products of our soil. The revolution in the labor system which resulted in the emancipation of the slaves, left our planters without any means of properly handling this crop in the field and in the house. This, with the high price of grain, induced many to turn their whole attention to cereals and neglect tobacco entirely. The consequence of this course is witnessed in the continued decline of the production of this staple, during every year since 1860. This is clearly shown in the following table of inspections (or offerings) of tobacco at the Peper warehouse, from 1863 to 1869, inclusive:

				Hhds.
1863	inspected in round numbers.			15,000
1864	"	"	"	40,000
1865	"	"	"	25,000
1866	"	"	"	17,000
1867	"	"	"	21,000
1868	"	"	"	18,000
1869	"	"	"	10,000

The very low inspection of 1869, it is well to remark, was occasioned by bad weather, and is not a fair indication of the capacities of Missouri. The tobacco of this Stato has always enjoyed an excellent reputation among dealers for its silky texture and freedom from grit. It has all the good and none of the bad qualities of the Virginia tobacco, and is admitted by all good judges to be a superior article. At these tobacco fairs, of which this is the fourth, Franklin, Callaway and Pike have generally carried off the prizes, but it is an almost universal opinion among the trade that Greene and the other counties of South-west Missouri present the finest tobacco region in the Union. It is believed that those counties need only the developing influence of the railroad to swell their production, which now just about supplies the local manufacturing demand, to large proportions.

TOBACCO IN OTHER STATES.

At present the largest tobacco-growing States are Virginia, Kentucky, Maryland and Ohio. The principal tobacco markets are New York, Richmond, Louisville, Baltimore and New Orleans. The crop year at these points terminates at various periods, ranging from September to January, owing to which fact there is great difficulty in getting hold of reliable statistics. We give, however, such as we can obtain, most of them being from Hunt's Year Book.

LEAF TOBACCO.

The production of leaf tobacco in the United States for four years is estimated as follows, in hdds:

	1867.	1868.	1869.	1870.
Virginia	50,000	50,000	35,000	60,000
Kentucky,	80,000	130,000	140,000	185,000
Maryland	30,000	28,000	28,000	35,000
Ohio	8,000	17,000	17,000	17,000
	168,000	225,000	220,000	297,000

The following table will show the aggregate receipts, shipments and stocks of leaf tobaoco from the principal ports of the United States, comprising New York, New Orleans, Richmond and Baltimore, at the close of four years, in hhds:

	1867.	1868.	1869.	1870.
Receipts	220,166	151,058	202,995	163,206
Shipments	189,648	126,392	156,648	112,542
Stocks	41,173	29,141	35,174	42,272

The greater portion of the shipments, some 66,981 hhds., were to Great Britain, Germany and France. The decline in the trade indi cated was shared equally by all the cities before mentioned, excepting New Orleans, where the receipts increased from 12,010 in 1867 to 28,-696 in 1869, but fell back to 18,372 hhds. in 1870. The difference between the production and the shipments shows that a very large increase in the home consumption has taken place.

SEED-LEAF TOBACCO.

The production of seed-leaf tobacco in the United States for four years is thus estimated by hhds.:

	1867.	1868.	1869.	1870.
Connecticut and Massachusetts	16,400	30,000	27,000	25,000
New York	4,000	6,000	5,000	8,000
Pennsylvania	4,000	7,500	10,000	16,000
Ohio and West	20,000	14,500	18,000	30,000
	44,400	58,000	60,000	79,000

The movement of seed-leaf is principally through New York. It will be noticed from the above that the production is increasing rapidly, but at the same time the home consumption is more than keeping pace with it. The war in Europe not only cut off the export demand, but caused the return of some 2,000 cases to this country, and yet prices advanced and stocks were reduced to a very low point.

The estimated stock of old seed-leaf on January 1, 1870, was	15,000 cases.
Estimated crop of 1870	79,000 "
Total supply for 1871 (estimated)	94,000 "

The export from the port of New York for the past four years has been—in 1867, 42,784; in 1868, 23,539; in 1869, 21,570; in 1870, 7,312 cases.

SPANISH TOBACCO.

Most of this tobacco imported arrives at New York. The trade has enjoyed a good degree of prosperity during the past year. The following is the importation for four years:

	Havana, bales.	Java, bales.	Total, bales.
1870	56,105	2,748	58,853
1869	77,050	1,781	78,831
1868	54,189	12,131	66,320
1867	46,495	2,192	48,687

The reshipments to foreign ports were:

	Havana, bales.	Java, bales.	Total, bales.
1870	10,882	252	11,134
1869	37,953	633	38,586
1868	15,904	5,890	21,794
1867	27,110	.....	27,110

PREMIUMS.

The premiums offered at the fair were given by tobacco dealers and other merchants of St. Louis who are desirous of stimulating and improving the culture of tobacco, and calling attention to the advantages of this market. The premiums were as follows:

FIRST CLASS.

For the best hhd manufacturing leaf, not less than 400 lbs net $200
For the second best hhd manufacturing leaf, not less than 400 lbs net..... 100
For the third best hhd manufacturing leaf, not less than 400 lbs net..... 50
For the best hhd sun-cured fillers..... 50
For the second best hhd sun-cured fillers..... 25

SECOND CLASS.

For the best hhd shipping leaf, not less than 1,200 lbs net..... $100
For the second best hhd shipping leaf, not less than 1,200 lbs net..... 50
For the third best hhd shipping leaf, not less than 1,200 lbs net..... 25

THIRD CLASS.

For the best hhd cutting leaf, not less than 800 lbs net..... $150
For the second best hhd cutting leaf, not less than 800 lbs net..... 50
For the best five hhd cutting leaf, offered by any one party..... 150
For the second best five hhds cutting leaf, offered by any one party..... 50

FOURTH CLASS.

For the best hhd black wrappers, not less than 950 lbs net $100
For the second best hhd black wrappers, not less than 950 lbs net..... 50

FIFTH CLASS.

For the best prized hhd leaf, not less than 950 lbs net..... $75
For the second best prized hhd leaf, not less than 950 lbs net..... 50

SIXTH CLASS.

For the best five hhds factory-dried shipping leaf, quality and handling considered, offered by any one party..... $150
Additional premium, offered by C. A. Lawton, agent G. W. Dispatch..... 50
For the second best five hhds factory-dried shipping leaf, quality and handling considered, offerred by any one party..... 50
For the third best five hhds factory-dried leaf, quality and handling considered, offered by one party..... 50

SEVENTH CLASS—SWEEPSTAKES.

For the best hhd manufacturing leaf, to weigh not less than 400 lbs net, (open to general competition)..... $100

EIGHTH CLASS.

For the best hhd tobacco produced by the following States, not receiving a premium in any other class:

Virginia	$50
Tennessee	50
Indiana	50
Missouri	50
Kentucky	50
Ohio	50
Illinois	50

An entrance fee of three dollars per hogshead, in addition to the regular warehouse fees, was charged. The packages competing for the premiums were entered by commission merchants, either in their own names or for the producers of the tobacco. The following were

THE ENTRIES.

Alexander Mack, 5 hhds; J. E. Haynes, 12 hhds; C. Alexander, 14 hhds; Whittaker, Virden & Grey, 3 hhds; Sam Pelts & Co., 14 hhds; J. W. Booth & Sons, 51 hhds; C. and R. Dormitzer & Co., 20 hhds; Bell & McCreery, 3 hhds; Sterling Price & Co., 33 hhds; Thos. Rhodus & Co., 18 hhds; Wahl & Carpenter, 3 hhds; E. M. Samuel & Sons, 1 hhd; Senter & Co., 1 hhd.

Messrs. Booth & Sons, who had the largest number of entries, made them for the following competitors:

3 hhds for G. W. Hines of Ballard county, Ky.; 4 for P. Smith of Louisville, Ky.; 2 for R. Mallay & Co., of Cincinnati; 5 for J. C. Turner of Macon, Mo.; 10 for Jno. C. Miller of Keytesville, Mo.; 10 for E. R. W. Thomas of Covington, Ky.; 1 for V. Black of Macon county, Mo.; 1 for J. L. Gilbert & Co., of Portland, Mo.; 1 for J. W. Buchanan of Paducah, Ky.; 1 for W. T. Boon of Clarksville, Mo.; 1 for Norman & Bro. of Marion, Ills.; 7 for Jno. W. Stone of Lynchburg, Va.; and 5 for E. D. Christian & Co., of Richmond, Va.

Messrs. Sterling Price & Co. had tobacco on exhibition from James T. Gray, Richmond, Virginia; from John M. Sheppard of the same place, and C. B. Hunt of Louisville, Kentucky. They also exhibited tobacco from the following growers:

Wm. H. Taylor, Franklin county, Mo.; John May, do; Wm. D. Herndon, Osage county, Mo.; Wm. Herndon, do; Wm. S. Comer, Callaway county, Mo.; J. W. Elliott, Bracken county, Ky.; J. T. Richardson, Hart county, Ky.; J. M. Clark, Jefferson county, Ill.; Joseph Chalmers, do; and W. W. Powell, Chariton county, Mo.

Messrs. Thomas Rhodus & Co. exhibited 18 hhds of tobacco grown by the following persons:

Branch May, Franklin county, Mo.; H. Godby, Callaway county, Mo.; D. C. Warren, Jefferson county, Ills.; Capt. Alex. Smith, Clermont county, Ohio; Wood Browning, Berkesville, Ky.; J. B. Reynolds, Franklin county, Mo.

The fair was opened at 9 A. M., with about 100 persons present. Mr. W. M. Samuel was appointed presiding officer, for the purpose of announcing premiums, etc. At 10 o'clock he called the assemblage to order, and after a short address of welcome to planters and merchants from abroad, read the names of the gentlemen appointed to act as committees on awards. These were:

AWARDING COMMITTEES.

First Class—W. G. Morris, Cincinnati, Ohio; W. A. Jackson, Clarksville, Mo.; J. K. Earickson, St. Louis, S. P. Haynes, Quincy, Ills.; Wm. M. Price, St. Louis; Jas. T. Drummond, Alton, Ills.; Harry Dausman, St. Louis.

Second Class—Jas. T. Callaway, Ky.; Lloyd Dorsey, St. Louis county; M. Alexander, St. Louis; Geo. W. Lee, St. Louis; Wm. H. Johnston, St. Louis.

Third Class—J. M. Miller, St. Louis; Richard Mallay, Cincinnati; Joseph Moran, St. Louis; F. Dunker, St. Louis; Christian Peper, Jr., St. Louis.

Fourth Class—A. Tinsley, Louisiana, Mo.; A. Turner, Clarksville, Mo.; Geo. Meyers, Alton, Ills.; J. G. Tatum, Wentsville, Mo.; John Meyers, Louisiana, Mo.

Fifth Class—John Seibert, Louisiana, Mo.; W. C. Woodson, St. Louis; Norman Porter, Louisville, Mo.; W. G. Porter, Springfield, Mo.; Geo. D. Loker, St. Louis.

Sixth Class—Jas. P. Miller, Richmond, Va.; Patrick Keller, Dublin, Ireland; John A. Comer, Callaway county; Jas. A. Gregory, St. Louis; B. A. Caskie, Rocheport, Mo.; Peter Speth, Louisville, Mo.; M. J. Barker, Cincinnati.

Seventh Class—Same committee as first class.

Eighth Class—W. B. Spalding, Louisville, Ky.; Alex. Mack, Cincinnati; D. P. Rowland, St Louis; A. J. McCune, Louisiana, Mo.; J. E. Liggett, St. Louis.

While the committees were engaged in examining the samples and deciding as to their merits, the assemblage, which had by this time increased to upward of two hundred persons, remained below, inspecting the hogsheads of tobacco exposed for exhibition.

VISITORS.

In the gathering there were our principal tobacco merchants, with numbers of wealthy planters and tobacco dealers from the tobacco growing States. The following are the names of visitors registered:

A. Tinsley, Louisiana, Mo.; S. W. Chunn, Hannibal, Mo.; S. P. Haynes, Quincy, Ills.; M. J. Barker, Cincinnati, O.; W. H. Shelton, Callaway county, Mo.; Wm. Herndon, Osage county, Mo.; J. A. Comer, Callaway county, Mo.; Wm. H. Tyler, Franklin county, Mo.; Col. B. A. Caskie, Rocheport, Mo.; J. L. Meyers, and Jno. Seibert, Louisiana, Mo.; Jas. T. Tatum, Wentsville, Mo.; Jno. C. Metler, Keytesville, Mo.; Alex. Mack, Cincinnati; Wm. D. Herndon, Osage county, Mo.; William H. Jackson, Clarksville, Mo.; A. J. McCune, Louisiana, Mo.; W. Thornberry, Paducah, Ky.; W. A. Woodson, Chain of Rocks, Mo.; Norman Porter, Missouri; James C. Miller, Richmond, Va.; J. W. Smith, Readsville, Mo.; John B. Gregory, Readsville, Mo.; G. W. Henry, Williamsburg, Mo.; J. J. Brown, Franklin county, Mo.; Richard Mallay, Cincinnati, O.; W. W. Powell, Brunswick, Mo.; Wm. H. Pollard, Perryville, Mo.; A. Turner, Perryville, Mo.; Robert H. Wright, Perryville, Mo.; W. G. Porter, Springfield, Mo.; W. S. Comes, Boydsville, Mo.; Charles Behrens, Alton, Ills.; W. G. Morris, Cincinnati; J. C. Turner, Macon, Mo.; Wm. Grassmuck, Lloyd Dorsey, W. P. Boon, Clarksville, Mo.; Geo. Lauitz, St. Louis; R. J. Morrow, St. Louis; Jno. A. Comer, Callaway county, Mo.; W. D. Spalding, Louisville, Ky., G. S. Meyers, Alton, Ills.; J. T. Drummond, Alton, Ills.; Peter Speth, Louisville, Ky.; G. W. Hines, Louisville, Ky.; R. A. Roddy, Providence, Mo.; E. Day, Peoria, Ills.; Chas. R. Hurd, Cairo, Ills.; Patrick Keller, Missouri.

Shortly after noon the awarding committees announced that they had completed their task. Gov. Brown, who had entered the ware-

house a few minutes previously, was called on to bestow the prizes. On taking the stand he said:

REMARKS OF HON. B. GRATZ BROWN.

GENTLEMEN: I did not come here this morning with any other idea than merely to look on at one of the great exhibitions of the industry of our State, but I have been invited to assist in delivering the premiums. I take great pleasure in contributing in any manner I can to promote, assist and facilitate what I believe is eventually to be a great leading enterprise of Missouri; and I shall always be gratified if, in the course of the natural lines of industry, we can concentrate here in the city of St. Louis, in which the whole State has a pride, a market that shall be co-extensive in reputation with the world. [Cheers.]

The premiums were then awarded as follows:

THE AWARDS.

FIRST CLASS.

Hogshead best manufacturing leaf, prize $200; awarded to G. W. Haynes, grower, Ballard county, Ky.; entered by J. W. Booth & Sons.

Hogshead second best manufacturing leaf, prize $100; awarded to J. T. Richardson, grower, Hart county, Ky.; entered by Sterling Price & Co.

Hogshead third best manufacturing leaf, prize $50; awarded to W. R. Bowman, grower, Virginia; entered by C. Alexander.

Hogshead best sun-cured fillers, prize $50; awarded to W. Browning, grower, Bradford county, Ky.; entered by Thomas Rhodus & Co.

Hogshead second best sun-cured fillers, prize $25; awarded to G. W. Haynes, grower, Ballard county, Ky.; entered by J. W. Booth & Sons.

SECOND CLASS.

Hogshead best shipping leaf, prize $100; awarded to J. H. Buchanan, grower, of Kentucky; entered by J. W. Booth & Sons.

Hogshead second best shipping leaf, prize $50; awarded to H. H. Hobson, grower, Kentucky; entered by S. Pelts & Co.

Hogshead third best shipping leaf, prize $25; awarded to J. M. Clark, grower, of Jefferson, Ill.; entered by Sterling Price & Co.

THIRD CLASS.

Hogshead best cutting leaf, prize $150; awarded to J. W. Elliott, grower, of Bracken, Ky., entered by Sterling Price & Co.

Hogshead second best cutting leaf, prize $50; awarded to ———; entered by J. W. Booth & Sons.

Five hogsheads best cutting leaf, prize $150; awarded to E. R. W. Thomas, grower, of Covington, Ky.; entered by J. W. Booth & Sons.

Five hogshead second best cutting leaf, prize $50; awarded to E. R. W. Thomas, grower, of Covington, Ky.; entered by J. W. Booth & Sons.

FOURTH CLASS.

Hogshead best black wrappers, prize $100; awarded to James F. Callaway, grower, of Kentucky; entered by Sam. Pelts & Co.

Hogshead second best black wrappers, prize $50; awarded to ———; entered by C. & R. Dormitzer & Co.

FIFTH CLASS.

Hogshead best prised leaf, prize $75; awarded to J. B. Reynolds, grower, of Franklin, Mo.; entered by Thomas Rhodus & Co.

Hogshead second best prised leaf, prize $50; awarded to ———; entered by Thomas Rhodus & Co.

SIXTH CLASS.

Five hogsheads best factory dried shipping leaf, prize $150; awarded to John C. Miller, grower, of Keytesville, Mo.; entered by J. W. Booth & Son.

Four hogsheads, with additional premium offered by C. A. Lawton, prize $50; awarded to Jno. C. Miller, grower, of Keytesville, Mo.; entered by J. W. Booth & Sons.

Five hogsheads second best factory dried shipping leaf, prize $50; awarded to W. W. Powell, grower, of Brunswick, Mo.; entered by Sterling Price & Co.

Five hogsheads third best factory dried shipping leaf, prize $25; awarded to John C. Miller, grower, of Keytesville, Mo.; entered by J. W. Booth & Sons.

SEVENTH CLASS.

Hogshead best manufacturing leaf (sweepstakes), prize $100; awarded to A. Tinsley & Co., growers, (Virginia tobacco), of Louisiana, Mo.; entered by Craig Alexander.

EIGHTH CLASS.

Hogshead best leaf produced by Virginia, prize $50; entered by Sterling Price & Co.

Hogshead best leaf produced by Tennessee, prize $50; awarded to J. E. Daniel, grower, of Tennessee; entered by Sam. Pelts & Co.

Hogshead best leaf produced by Indiana (no competition), prize $50; awarded to Peter Speth (Indiana tobacco), of Louisville, Ky.; entered by J. W. Booth & Sons.

Hogshead best leaf produced by Missouri, prize $50; awarded to Mr. Brown, grower, of Franklin, Mo.; entered by C. & R. Dormitzer.

Hogshead best leaf produced by Kentucky, prize $50; awarded to S. Carpenter, grower, of Hart county, Ky.; entered by J. W. Booth & Sons.

Hogshead best leaf produced by Ohio, prize $50; entered by Thomas Rhodus & Co.

Hogshead best leaf produced by Illinois, price $50; awarded to Norman & Bros., growers, of Marion, Ill.; entered by J. W. Booth & Sons.

The utmost good feeling prevailed while the awards were being announced, and the proceedings were enlivened by jokes and repartee among the dealers. At the collation which was given by the warehouse company, no time was occupied with speech-making, and the guests having lunched, the sale of premium tobacco commenced.

THE SALE

Was opened at one o'clock, Mr. Gunn, tobacco inspector, acting as auctioneer. The first class tobacco was sold at the following rates:

Best manufacturing leaf, at $160, to Liggett & Dausman, St. Louis; second best manufacturing leaf, $90, purchased by Hammer & Hormann, St. Louis; third best manufacturing leaf, at $76, Norris & Jackson, Clarksville, Mo. Best sun-cured fillers, $23, Liggett & Dausman; second best sun-cured fillers, $35, by Myers & Drummond, Alton, Ill.

On the last lot of this class the bidding was spirited, starting at $25—$2 higher than the price at which the sample which had taken a higher prize was knocked down.

The sweepstakes prize, best manufactured leaf, was next offered. The bidding was started at $100, and it was knocked down to Liggett & Dausman at $125.

The second class tobacco sold as follows:

Best shipping leaf, at $12, to Shryock & Rowland, St. Louis; second best shipping leaf, $12, t Shryock & Rowland; third best shipping leaf, $10, to Shryock & Rowland.

Third class: Best cutting leaf, at $44, to Leggat, Hudson & Co., St. Louis; second bes cutting leaf, $40, to Leggat, Hudson & Co., St. Louis; best cutting leaf, withdrawn; second best cutting leaf, withdrawn.

Fourth class: Best black wrappers, at $16.50, to Liggett & Dausman; second best black wrappers, at $19, to Myers & Drummond, Alton.

The bidding on this second lot was started at $10, and immediately raised to $16.50, from which it rose by small but quick bids to the rate at which it was sold.

Sixth class: Best factory dried shipping leaf (which won the additional premium offered by C. A. Lawton) sold at $12 to Boyce & Bro., St. Louis; second best factory dried shipping leaf, $11.75, to Boyce & Bro., St. Louis; third best factory dried shipping leaf, $11, to W. H. Johnston, St. Louis.

Eight class: Best leaf produced by Virginia, $79, Myers & Drummond; best leaf produced by Tennessee, $50, Glen, Overall & Co., Louisiana, Mo.; best leaf produced by Indiana, $12.75, Liggett & Dausman, St. Louis; best leaf produced by Missouri, $40.50, W. Farzer, St. Louis; best leaf produced by Kentucky, $59, Myers & Drummond; best leaf produced by Ohio, $21, Leggat, Hudson & Co.; best leaf produced by Illinois, $20.25, Myers & Drummond.

This concluded the sale of premium tobacco, and the fair was brought to a close.

AGRICULTURAL EDUCATION.

PROCEEDINGS OF A CONVENTION

HELD AT

CHICAGO, ILLINOIS, AUGUST 24-25, 1871.

PROCEEDINGS.

In accordance with the call of a circular, published throughout the country, the following gentlemen convened in one of the halls in the Prairie Farmer Building, on Thursday, August 24, 1871, at 10 A. M.:

1. Dr. J. M. Gregory, Champaign, Illinois, Regent of the Illinois Industrial University.
2. Dr. Manly Miles, Lansing, Michigan, Professor of Practical Agriculture, Michigan Agricultural College.
3. Dr. Joseph Denison, Manhattan, Kansas, President Kansas Agricultural College.
4. Professor D. C. Gilman, New Haven, Conn., Professor Physical Geography and History, Sheffield Scientific School.
5. Professor A. N. Prentiss, Ithaca, New York, Chair of Botany and Horticulture, Cornell University.
6. Professor John Hamilton, Agricultural College P. O., Pennsylvania, Professor of Agriculture, Pennsylvania Agricultural College.
7. Professor E. W. Hilgard, Oxford, Mississippi, Professor of Chemistry, University of Mississippi.
8. G. C. Swallow, Columbia, Missouri, Professor of Agriculture, University of Missouri.
9. Dr. E. S. Hull, Alton, Illinois, Lecturer on Vegetable Physiology and Fruit Growing, Illinois Industrial University.
10. W. W. Daniels, Madison, Wisconsin, Professor of Agriculture and Analytical Chemistry, University of Wisconsin.
11. Rev. R. D. Parker, Manhattan, Kansas, Secretary of the Board of Regents Kansas Agricultural College.
12. W. W. Folwell, St. Anthony, Minnesota, President University of Minnesota.
13. S. H. Peabody, Amherst, Massachusetts, Professor Massachusetts Agricultural College.
14. A. S. Welch, Ames, Iowa, President Iowa Agricultural College.
15. I. H. Roberts, Ames, Iowa, Farm Superintendent, Iowa Agricultural College.

16. W. W. McAfee, Madison, Wisconsin, Farm Superintendent, Wisconsin University.

17. W. C. Flagg, Moro, Illinois, Corresponding Secretary Board of Trustees, Illinois Industrial University.

18. Edward Snyder, Champaign, Illinois, Professor of Military Tactics, etc., Illinois Industrial College.

19. Dr. H. J. Detmers, Champaign, Illinois, Lecturer on Veterinary Science, Illinois Industrial University.

20. H. D. Emery, Chicago, Illinois, Editor Prairie Farmer.

21. W. W. Corbett, Chicago, Illinois, Editor Prairie Farmer.

22. G. E. Morrow, Madison, Wisconsin, Editor Western Farmer.

23. T. H. Glenn, Chicago, Illinois, Editor of the Western Rural.

24. Julius Silversmith, Chicago, Illinois, Editor of the Amerikanisdier Farmer.

25. C. W. Murtfeldt, St. Louis, Mo., Secretary Missouri State Board of Agriculture.

26. Milton George, Chicago, Illinois, Editor Western Rural.

27. Edward Young, Joliet, Illinois.

28. Mansfield Young, Joliet, Illinois.

29. William Watkins, Joliet, Illinois.

TEMPORARY ORGANIZATION.

Dr. Miles, Professor of Agriculture in Michigan College, called the meeting to order, and nominated Dr. Gregory, Regent of Illinois Industrial University, as Chairman *pro tem.*

Dr. Gregory said that this Convention represented an interest never before represented in a like manner in this country. Practical men, like those there assembled, believed in deeds rather than words. If he apprehended the object of the Convention, it was to deliberate about their peculiar duty, as practical scientific men, to whom vast public interests had been committed, about which great solicitude was felt. There were many things to be done about which the only light they had came to them from over the water; consequently there were many changes to be made, and many new things to be attempted. To meet these claims, and to do their duty and fulfill the objects of the Congressional land grant, they desired a free and full discussion, and to secure co-operation, especially so as to agricultural courses and agricultural experiments. In this country the business was new and raw. To secure uniformity of proceeding in experiments, and mutual understanding, this Convention was called.

The Hon. W. C. Flagg was nominated as Secretary *pro tem*, but at his urgent request his name was withdrawn, and Prof. Prentiss, of Cornell University, chosen.

COMMITTEES.

A motion to appoint a committee of three on permanent organization was carried, and Dr. E. S. Hull, Mr. Glenn, of the Western

Rural, and Prof. Daniels, of Wisconsin, were selected as such committee.

A motion to select a committee of five on Order of Business resulted in the choice of Dr. Miles, of Michigan; Prof. Gilman, of Sheffield; W. C. Flagg, of Illinois; Prof. G. C. Swallow, of Missouri, and the Rev. Mr. Parker, Secretary of the Kansas Agricultural College.

The question of how long the Convention would sit was sprung. Dr. Miles was willing to stay until the business which may come up was concluded.

Mr. Flagg moved that the Convention endeavor to conclude its business by to-morrow evening. This expression, offered as a motion, carried.

EXPERIENCE MEETING.

The Convention resolved itself into a sort of experience meeting.

Dr. Miles, of Michigan, was called upon, and spoke substantially as follows:

Our college, as you all know, was started several years before the Congressional Land Grant act was passed, to aid in giving prominence to the practical agricultural department. My own experience has been with the practical, of which we have two distinct departments, the horticultural and agricultural. I have had charge of the latter for the last eight years. Our students are required to labor three hours per day; we do not think labor interferes with the studies, and generally the best students inside are also the best workers outside. We find great difficulty in conducting an agricultural experiment satisfactorily, because it is difficult to get a proper standard of comparison, and also with animals; for instance, there is a great difference between old and young. We now place animals each by themselves; all animals which are not found in proper condition to assimilate food are thrown out. In our experiments, we have found that animals consume more food in the first stages than afterward.

We have about 400 acres. A large amount of work is done by the students. I should have stated above, that all our students work at the same time. We have, however, men enough employed to carry on the farm independent of the labor of the students.

Prof. E. W. Hilgard, of Mississippi, being called on, said he had come here to get information, and, therefore, would ask of Prof. Miles: Does your farm make lucrative returns, or is it an expense?

Prof. Miles—It is not an object primarily to make the farm pay, but ours pays as well as other farms. We propose to carry on the farm operations economically, but do not farm for profit.

President Gregory—If you do not make any more than the ordinary expenditures of other farmers, would it pay as well?

Prof. Miles—Yes, certainly. There are a few things which we do not expect to pay, as, for instance, the keeping of male animals of

different breeds, which must be kept pure, and can serve only a few females.

To the question as to how many of the graduates of agricultural colleges become, or rather remain, farmers, Dr. Miles said he could not answer the question very accurately, but he felt safe in saying nearly 75 per cent.

Prof. W. W. Folwell, of Minnesota University, said he had no report to make. Although the Agricultural Department had been opened technically, they had as yet done but little. They did have a good piece of land for an experimental farm, a good deal of hope, and some confidence.

Prof. D. C. Gilman, of the Sheffield Scientific School, of New Haven, Conn., in answer to a call, responded that that institution could not properly be called an agricultural college, though they had two Professors of Agriculture and half as many students; that it was a distinct college, although a part of Yale. They had constantly recruited students from the farms, but were sending but few back; if they had any distinctive work it was to train up scientific men.

President Denison, of Kansas Agricultural College, said that Pennsylvania had much experience, and he therefore would call on Prof. Hamilton, from that State.

Prof. Hamilton said he did not like to go into detail at that stage of the meeting, but would do so at a future time. But, being urged to speak, he said that Pennsylvania had three model and experimental farms; one near Philadelphia, one near Pittsburgh, and one in Center, where the college buildings are located. By this division, they secured a diversity of soil and climate. Each of these farms contained about one hundred acres. Thirty-five acres of each hundred were used for experimental purposes; the rest as a model farm, in the sense of elevating the general standard of farms. In order to provide the necessary stock, each farm had received as donations from citizens of Pennsylvania, about $5,000. The same experiments were carried on on each of the farms, and were carried on continually. There were about forty-four plats on which experiments in the rotation of crops were tried, including experiments with manure, domestic and commercial. Then they had another lot of plats, for grains, seeds and vegetables, and another for forage plants for the soiling of stock. The students, seeing these experiments on one farm, saw all; but it was in contemplation to have all the students visit each farm.

To the question of how much labor was required of each student, Prof. H. answered by saying four hours every other day, or eight hours one week and twelve the next. The freshman and sophomore were the only classes that labored, students of a higher grade not working. They started out with the idea that labor was honorable, and that all should work three hours each day, but the regents did not think the plan worked well. The students seemed to think that they were supporting the college, which could not be denied. They

then agreed upon the present plan; the labor was not paid for except when performed extra. The Professor seemed to think that much of the labor required at first, such as picking up thousands of four-horse loads of stone, was not very agreeable. The present system had been in force two years, and worked well. They kept hands enough to carry on the farm independent of the student labor. In answer to a question, he said students generally did not care for the animals, or to work with teams.

The question was asked: Did the labor required of the students have any connection with their immediate studies: He said: Not so much as it ought to have.

President Denison, of Kansas, being called upon, said that new States and new institutions had but few experiments to report. He would say that they had had a fine opportunity to select lands. They had sold about one-half, and had now an income of $20,000, which would still be increased. They had, until recently, eighty acres of land, with the college building, and inclosed by a stone wall, which cattle respected. The land had been increased to 415 acres. They hoped to devote a part of this to a nursery for fruit and forest trees, which would pay. Men and women were admitted, and thus far the women had been able to hold their own in the studies. They required one hour's labor per day of each student, male and female; if more was performed it was paid for. The Faculty numbered twelve professors.

PERMANENT ORGANIZATION.

The Committee on Permanent Organization presented the following list of officers:

President—Hon. J. M. Gregory, LL. D., President Illinois Industrial University.

Vice-Presidents—Dr. Manly Miles, Professor of Agriculture in the Michigan Agricultural College; Rev. Joseph Denison, D.D., President Kansas Agricultural College; and Professor D. C. Gilman, of the Sheffield Scientific School.

Secretaries—Professor A. N. Prentiss, Cornell University, and Professor John Hamilton, of the Agricultural College of Pennsylvania.

The officers were elected, after which the meeting adjourned until 2 o'clock.

AFTERNOON SESSION.

The Convention met pursuant to adjournment.

The Chairman—We were in the midst of reports. It is for the Convention to say whether they shall be continued.

Mr. Flagg—Mr. President, our members are not all in yet, I believe, and I would like to bring up a little matter while they are gathering, if it would be in order: the question of arranging for continuing this organization in future years. Some of us had a plan under consideration of forming a permanent organization to meet from year to year, or oftener, for the purpose of continuing consultation, experimentation and comparison of experimentation, and the continuous laying out of experiments to be performed in common—doing that much at least. Perhaps the organization ought to go further. Perhaps it ought to be an organization of the agricultural colleges and the technological schools. I want what would be best, and would like to bring before the meeting the question of continuing the organization in the future, and get an opinion upon it.

The Chairman—Will the Convention take any action on the matter of future permanent organization?

Mr. Murtfeldt—If it comes up in the shape of a resolution, we can discuss the matter. If a resolution of that kind is offered I would defer action until a later stage of the proceedings.

The Chairman—That would be a proper way to bring it before us, and refer the matter to a special committee to report on the subject.

Mr. Hilgard—I would move it be referred to a committee.

The motion was carried.

The Chairman—I will appoint Prof. Hilgard, of Mississippi, Hon. Mr. Flagg, of Illinois, and President Folwell, of Minnesota.

[We received, just at the close of the morning session, an invitation through Geo. S. Bowen, Esq., of this city, to visit Riverside, one of the suburban towns to this city, which has been laid out in fine style, at such a time as will suit our convenience.]

The Chairman—The report of the Committee on Business will be in order, if they are ready to report.

The Committee on Business submitted a report, naming the following for discussion this afternoon:

"What experiments should the agricultural colleges try in common, and what should be the method of conducting them?" Dr. Miles, of Michigan Agricultural College, to open the discussion.

For this evening:

"The relations of schools of applied science to one another and to other institutions." Professor Gilman, of the Sheffield Scientific School, to open the discussion.

On motion of Mr. Hilgard, the report was adopted.

The Chairman—According to the programme, the discussion of the experiments which may be made in common by the several institutions will be opened by Dr. Miles.

Mr. President and Gentlemen of the Convention:

The subject is a difficult one to present. The number of experiments that might be tried by the agricultural colleges, and those interested in agricultural improvement, is almost without end.

The programme provides for the discussion of the experiments that it would be desirable to conduct in common by the different institutions, and also the method of conducting them. In presenting this subject, I shall reverse the order, and speak for awhile in regard to the method of conducting experiments, and the difficulties in the way of their prosecution.

Very often we speak of experiments for the promotion of agriculture in a very loose and indefinite manner. It seems to me desirable, on the start, to draw a line of distinction between those experiments which tend to improve the *science* of agriculture, and those which have for their object the improving of the *art*. Art is one thing and science is another. Art has to do with practice; it has to do with the ways and means of accomplishing objects. Science has to do with the explanation of those processes which are made use of in the art. We may have a rule of practice in the art, derived from observation and experience. Science may step in and explain that rule. The rule, as such, has been developed experimentally; it has been developed empirically—that is, by a series of trials. The explanation of this rule constitutes the science. Science has nothing to do with the practical application, in its strict signification. Science has to do with causes and effects. It matters not to the scientific man what the pecuniary results are; but he is concerned simply in the changes taking place in the matter which he is investigating. Now, if we attempt to combine, or rather if we confuse, these two terms in our experiments, we shall not meet with the success that we ought to expect from a systematic effort at improvement. Field experiments—experiments in the cultivation of different crops, the application of manures, analysis of soils, feeding of animals—all have to do with the art. We are simply making methodical hints for the sake of getting at rules to guide us practically. The scientific man may step in and make his investigation for the sole purpose of explaining these principles, or rules, which guide us in practice. Now, I apprehend at the present time no one can claim that we have any rules of practice that are derived from the teaching of science. I know of none in the art of agriculture. The rules of practice have

been derived from experience and observation. The world of science has stepped in and explained these rules. The rule is of no more force in practice than it was before. It simply serves to suggest new lines of inquiry for future experiments. On the start, it seems to me important that we make this clear distinction in regard to the experiments we would make.

In the next place, I will speak briefly of some of the difficulties—I alluded briefly to that this forenoon—in the way of successful experimentation; and in this discussion I wish to be understood as limiting my remarks entirely to those experiments which we inaugurate for the purpose of improving our practice—experiments for the improvement of the art.

In the first place, we have a great variation of soils. Unfortunately, they are variations we are not able to detect except by experimental trials; soils apparently similar so far as their compositions are concerned, and so far as their physical characters are concerned, give very different results. In the experiments at the Michigan Agricultural College, this was one of the most striking points brought out by our first experiment. Ordinarily, field experiments have been conducted by taking a single manured plat, and then comparing with it different plats to which had been applied different varieties of manure. The experiment was supposed to be complete. The comparison of the unmanured plat with the manured plat would apparently give an indication of the result. But such experiments misled us. We found on quite a number of unmanured plats, on soil precisely alike, so far as we could judge of their character and composition, a very great difference in yield. Peculiarities of climate and seasons will have much to do with varying the experiment, and this seems to be one reason why it would be desirable to try experiments at quite a number of different points, having all the conditions precisely alike so far as we can, making the conditions that vary simply those of climate, soil, etc.

There is another difficulty in the way of conducting field experiments which is exceedingly difficult to obviate—that is, the difference arising from variations in the cultivation. The time of the cultivation of each plat should be the same. Not only the same amount of labor should be expended on each plat, but that labor should be performed at the same time. From this you will see the difficulty of experiments on very large plats. If your plats are very extensive, and you have a large number of them, you can not harvest them all at the same time. You can not put in all the seed at the same time. Some two years ago, at the Agricultural College, we sowed a field of turnips. One-half of the field was sowed on the 3d of July, and the balance on the 4th, the seed being all from the same package, the same drill being used, and the same person running the drill. There was no difference in condition, so far as we could observe, except a slight shower in the intervening night, which would apparently give the

advantage to the latest sowing. The result was that the turnips sowed the first day produced a very large crop; those sowed the second day were hardly worth harvesting. There were four or five times as many turnips from the field sowed the first day as those from that sowed the second day.

This shows that we should exercise great caution in regard to cultivation; that it should be uniform, not only as to amount, but as to the particular time of performing the labor. It is important that field crops subjected to experiment should be weighed at the same time. If you have a large number of plats that are to be compared, and these plats are quite large, it must occupy considerable time. If so, there will be a difference in the amount of moisture, and this will vary the result. I had a striking illustration of it the present year, in the continuation of some experiments we started several years ago.

A field had been planted with corn for several years in succession, the plats all being treated alike. We found a great variation in the yield. Corn was put on the next year, and there was a great difference in the yield, but the plats that gave the largest yield the first year did not give the largest yield the second year.

After this, part of the plats were manured, and we followed on through a rotation of crops until we came to the clover crop, which was harvested this year. As soon as the crop was ready to cut, we tried to get enough help do it in a short time. The clover was weighed green. It was then stirred up and exposed to the action of the wind and sun, and put up in cocks. The next day it was spread out again, and when it was supposed this crop was in a fine condition for going into the barn, the plats were weighed; but it was thought there might be some variation from this cause, and they were allowed to remain, and afterward weighed again. The second weighing it was thought to be dry enough to go into the barn, and not excessively dry afterward. I give the result of the second and third weighings of the same plat:

SECOND WEIGHING.	THIRD WEIGHING.
261 pounds.	185½ pounds.
84 "	61 "
100½ "	68½ "
41 "	30 "
251½ "	175 "
119½ "	88 "
211 "	151 "
101 "	73½ "
165½ "	121 "
98½ "	71 "

It showed the manner in which we may be deceived by relying on our senses entirely.

You will readily perceive if we had a large number of plats, and they were of considerable size, you would get more difference in re-

sult if it was carried on in rotation, commencing on one side, and passing to the other side of the field. Guard against a difference in the results, arising from a difference in the amount of moisture, in root crops as well as others. It has been shown by some experiments made, that where turnips, for instance, have been manured, there was a great increase in the yield; but when the amount of water in the turnips was taken into account, it was found the amount of dry substance was precisely the same. The great increase arising from the manure was simply water—nothing more; and here is something that should be looked at.

In the feeding of animals, there are a great many difficulties in the way of satisfactory experiment. One of the first I will mention is that which may be termed individual peculiarities of animals. You may take animals of the same age, and the same size, or, as we have fed, pigs of the same litter, and we find one pig will give a much larger return for feed than another. It is something we can not get at, can not measure, can not detect, except by the experimental test of feeding.

Again, we find, as I mentioned this forenoon, when animals are first put up, they consume more feed in proportion to their weight than toward the close. We find they give a greater return for the feed consumed, during the earlier stages of the feeding, than afterward.

What is the cause of the variation? I apprehend there are three causes, and two of them I have no doubt about. The third, I am inclined to think, has an influence, yet it is an exceedingly difficult matter to determine. These peculiarities, or differences, are the age, the size and the ripeness. From the experiments we have already tried at the college, I have no doubt age has a very great influence upon the result. The young animal seems to have an organization capable of deriving more nutritive material from the same feed, so that it gives a larger return for feed, other things being equal, than when it gets older. The ripeness of the animal has much to do with it. When the animal is in a moderate condition, it will receive more nutrition from the food consumed than after it is excessively fat. The size of the animal perhaps has something to do with it. I am inclined to think it has, and you see we have a difficult problem to deal with, to determine how much of this variation is owing to difference in age, how much to difference in size of the animals, and how much to this difference in ripeness. By ripeness I mean the condition of the animal, as regards fat. The treatment of animals will have very much to do with the results. Animals that are carefully treated, and fed regularly, will give a larger return for food consumed, other things being equal, than those that are treated harshly, and kept in constant tumult from outside annoyances and interferences. The mental condition of the animal has undoubtedly very much to do with the progress it makes in feeding. We found when we were feed-

ing sheep in the experimental pens in the sheep barns—this building being occupied by other sheep—they did not make as much progress as when fed by themselves, and they would fall away at once as soon as there was an unusual disturbance among the sheep, in the outside pens of the same building.

There is another matter that should be taken into consideration: that is, the varying weights of animals, without apparent cause. If you weigh animals, at long intervals, you will undoubtedly find they are making very satisfactory progress from one weighing to another; but if you weigh them at short intervals, you will find they lose during one period, and gain the next. If you weigh them every day, you will find one day a loss, and the next day a gain, or perhaps two or three days of gain, and then a great loss. The progress made by the animal is an undulating line, and not a uniformly ascending line.

I do not know that I can give any satisfactory explanation of this variation in weights of animals, but I presume it is owing to a difference in the action of some of the secretory organs. It is probable their fluctuation in weight was owing to a loss of water in the animal rather than to a loss of dry substance, because where we find an animal has made a very great loss at one weighing, it will frequently make the least gain at the next weighing. If this loss in weight was owing to a defect in the animal, then we would suspect the animal was sick, or there was some derangement of the organs, and would not expect it to make such a rapid gain at the next weighing.

To obviate these difficulties, and make our experiment satisfactory—that is, in order to accomplish the object of experimenting—it seems to me we should pay especial attention to several particulars which I shall enumerate. In the first place, the experiment should be as simple as possible. A large proportion of the experiments made thus far have been of no value, for the reason that too much was attempted. For instance, a person wishing to test the real value of potatoes of different sizes for seed, plants his small potatoes in drills two feet apart, and the large potatoes in rows three feet apart. Here, you see, is a double variation. There was no condition the same, and no chance to compare such experiments; and a very large proportion of experiments have been vitiated in that way. It arises from attempting to determine two things at once: that is, the effect of variation in size of the seed, and the effect of variation in the rows. You have two elements, and you may try experiments as long as you please without any valuable results. It would be better to try one experiment and settle the matter in regard to size, having all the conditions precisely the same, and then take, as a separate experiment, one in which the different distances of the rows was the object of investigation. In reference to this difficulty in regard to the variation of the soil, it would be necessary to have a large number of unmanured plats for comparison. The increase of the manured plats

over the unmanured should be where the plats are treated precisely alike.

I think it would be desirable, also, to put crops for two or three years in succession upon the same land, before using it for experimental purposes. For instance, if you wish to test the value of manure as applied to soil, it would be better to mark out your plats accurately, and crop them for several years without any manure until you ascertain the peculiarities of this crop, and then continue the same crops with the addition of manure afterward; but in this case at least one half of the plats should be left unmanured for comparison, so that you may compare results alongside of the manured plats, and compare the plats with themselves, and also with the crops on the same plats in preceding years.

The question is often asked, what sized plats it is desirable to make in field experiments? That is a difficult question to answer. On some accounts it would be desirable to have the plats very small; on other acounts it would be desirable to have them of considerable size. Dr. Anderson states that he thinks the smaller plats are desirable; he would not have plats exceed 1-100 of an acre in area. Mr. J. B. Lawes, who is associated with Mr. Gilbert, in experiments conducted at Rothamstead, writes me he has no confidence in the experiments made on plats of less than 1-20 of an acre. There are two high authorities. Dr. Anderson is an able chemist and a very successful experimenter. Lawes and Gilbert are perhaps the best agricultural experimenters we have had. Their experiments are not accurate, but, taken on the whole, they are the best experiments that have been made. My own experience is, that a plat of from 1-100 to 1-20 of an acre should be the limits in size. The difficulties of the very small plats are, you are liable, when you are manuring, to have it extend its influence to the adjoining plats, and the roots of the plant will extend some distance into the soil, so that you are liable to be misled. When you come to weigh the produce of the plats, a very slight error will amount to considerable; when you make the calculation to ascertain the yield per acre, the error in a single plat would be multiplied by 100 in getting the standard for an acre. In a small plat it requires very great accuracy in weighing, great accuracy in the division of the plat, and great care in the management of the experiment throughout. To obviate this objeciion, that the roots run from one to another, I think it would be well to have space between the plats—a space of several feet left between those plats that are to be used for experimental purposes, and these spaces should be kept clean and free from weeds. But here comes another difficulty. Suppose you have plats laid out, and spaces of three feet between them, you must cultivate the spaces, and need to expend the same amount of cultivation on each one of the spaces as on the other, so that the crop adjoining may be equally influenced. Again, the spaces should be weeded carefully at the same time, cultivated at the same time,

and managed as carefully as the plats themselves, or you will vary the result in the plat.

The objection to the large plats I have already mentioned, but I will refer to it again. It is the difficulty of getting over a large area in a given time. If your plats are so large that it takes a whole day to go over them and perform the labor, you will be very liable to error from the variations mentioned.

Wires may be used for separating the plats, and that is a very convenient plan, and one we have practiced at the agricultural college, but it does not obviate the objection that the roots pass from one to another. It enables you to make a fair division between two adjoining plats, which is exceedingly difficult—more so than a person would think who has had no experience in the matter of making exact divisions through a crop of growing grain.

In the feeding of animals, I would be particular, as I mentioned, to have but a single animal in a pen. If I was going to feed twenty animals on a given feed, I would place each one in a pen by itself, and then would confine them to a single article of food. It would be an important matter to test the nature of corn meal, and corn prepared in different ways, as food for swine. The natural mode that would be suggested, conducting the experiment, would be to put a number of swine in a pen and give four or five of them corn unground, four or five more of them cooked corn meal, and four or five more uncooked corn meal. But I apprehend the results of the experiment would be very unsatisfactory, to say the least. I would not like to place any very great amount of reliance on it. I would prefer to take the same number of hogs and put them in pens separately and feed them with unground corn, and follow that up until I got the range of variation between the animals. Then I would take the same number and feed them corn meal; and if your arrangements are of sufficient extent, you may have these experiments going on at the same time. We have been feeding swine for a number of years, and have from ten to fifteen pens. We have fed nothing but raw meal thus far. The question is often asked, "Why don't you feed cooked meal?" I have not yet got the standard of comparison with raw meal, by which I can compare results with the cooked meal. There is a great range of variation in the animals, and there would be made a serious error in the experiment. This error has arisen very much from the force of circumstances. We could not get animals of uniform size and uniform ages to fill our farms, and for that reason, the attempt to do the two things which I have mentioned is objectionable. There has been so much variation in this matter that we need to have more experiments with cooked meal, and I would hardly know what to compare them with. So far as raw meal is concerned, notwithstanding the great variation, the rule I laid down holds good almost uniformly: the greater increase of food consumed during the early stage, and the dissemination in the amount of fat as the animals fatten. The animals for

feeding should not only be of the same age, but they should be as near as possible of the same size, and of the same degree of fatness, when they are put into the pen, in order to get a fair opportunity for comparison.

I do not wish to take up too much time on this, because I would like to hear from others. I have but one other suggestion to make in regard to the methods of conducting experiments, and that is the method of obtaining manures. The term manure is a very indefinite term. We take manure from our barnyards at different times, and it will vary very much in quality. The value of manure will depend on feed consumed; that is a fact well settled.

It is impossible to make a chemical analysis so as to get the value of it. A chemist may take a quantity and tell you what there is in the sample, but he can not analyze each load that you use. The method I would adopt is this: to take the animals and put them into a pen—into a box-stall—and would have it constructed tight, so there is no chance of losing any of the liquid constituents; and I would feed to the animals a definite amount of food; then I would take the results of these articles of food as we have them furnished by chemists in tables, as the measure of the value. Then take the manure from the box, and put it on the plat. By pursuing this method, you may get a number of boxes of precisely the same strength for all practical purposes.

In regard to the experiments which it would be desirable to try, I have mentioned but a few. There are many more that suggest themselves to me, and I speak of these simply for the reason that they seem to me as important as any, and for the further reason that I think they would be as easily tried as any. It does not seem to me best to attempt very complicated experiments at any particular institution, until a long experience has been had in experimenting—until the person experimenting becomes thoroughly familiar with all of the difficulties in the way. For the feed experiments I would simply try to ascertain the value of Indian corn in its different forms. After this is accomplished we may then take other grain in the same manner. After that I would take the grasses. In these experiments it would be desirable to have the same conditions observed by all the experimenters, otherwise the experiments can not be compared. If I feed corn meal in a particular way in Michigan, and it is fed in a different way in Illinois, Missouri or Pennsylvania, we can not compare results at all. You are not assisted in the one place by the investigations made in the other. The experiments must be conducted in all places precisely in the same manner; then you can compare results, bearing in mind that certain conditions which can not be controlled may influence the result.

The next class of experiments which I will suggest would be to determine the best methods of applying manure—the application of manure on the surface, or the application so that it may be plowed

under—and it would be desirable, likewise, to make experiments with reference to the application of these manures at different seasons; whether it would be best to apply manure in the spring on the surface, or in the fall. This will be found to be a very complicated problem, and one that will require great caution. I would endeavor, likewise, to ascertain the value of commercial fertilizers as compared with barn-yard manures. You want to know the constituents of which the manure is composed, and the fertilizer should be analyzed carefully. I have serious doubts of the propriety of farmers purchasing fertilizers. I have an idea they may be made cheaper by feeding animals. The barn-yard manure must be our staple manure for a long time. If we are to purchase other manure we ought to have some means of knowing how it compares with this.

I would like to have experiments made showing the effects of change on the growing crops. In a system which has been tried, wheat has been grown for quite a number of years in succession, and a yield of from thirty to forty bushels obtained without any manure. The system is this: The field is divided into strips of three feet in width. The wheat is sowed on the alternate strips. The vacant strips are kept thoroughly pulverized during the season, and the next year the wheat is put on the strips left bare the year before.

It would be desirable, likewise, to ascertain the methods of seeding in corn—whether hills or drills would be desirable. These experiments all require a great deal of care and accuracy, and they will require a good deal of study in order to fix the conditions upon which they shall be tried by a large number of persons, so that the results may be compared.

Prof. Hamilton—I scarcely know how to get at this matter. It seems to me, that before we start out to experiment at all, we should understand one thing, and that is, that in this art of agriculture, as it has been defined, aside from the science, no absolutely accurate result can be obtained from any experiment in the art of agriculture; that it is only by comparison—it is only relatively, in their relation one to another—that they become of value. Crops may differ largely in weight, as to the times in which they are taken. It has been shown that after they have been considered perfectly dry, there is a difference in weight. This fact, that they do differ in weight at different times, does not affect the experiment, because if they were weighed green, just as they were cut and taken into the barn, it shows the relation of these plats to one another; I think this would be found to be true in almost every case—as true as any portion of the experiment is. Every part of these experiments is attended with some error, and we wish to eliminate the error as far as possible, and in weighing of plants in that way—all of the plats at the same time, or as soon as may be—we get a result that is almost correct—not absolutely correct, for no result we obtain is absolutely correct, and only correct results can be obtained by carrying on these experiments for a great number of

years. The system of experimenting, as it has been carried on, has been a failure, and is of no value, inasmuch as they have been dropped after they have served a certain purpose; they have not been carried on persistently year after year, thereby developing a principle in agriculture, and not merely the curiosity of some person who is experimenting.

Now, in our experimenting for the Agricultural College in Pennsylvania, we have tried to avoid what the gentleman has clearly shown is an error we are apt to fall into, and become confused—that is, attempting two systems of culture, or putting in the same thing for two objects. It can not be done. We have failed on several plats for that very reason. The earlier experimenting was about a failure, just because we attempted to do too many things on the same grounds, and had more objects than one. There must be confined to each plat but a single object. If you have more, you lose control of the experiment, and afterward you have to experiment again to find out which of the two it is. Each plat in any proposed plan must be but a single experiment.

In regard to the size of these plats, it seems to me that the plan of having them so very small is one that probably is more liable to error than in having them large, although there are difficulties on the other hand; if your experiments are extended over a great deal of ground it is impossible, or almost impossible, to have them all carried along under the same conditions, but you can overcome that by going to extra expense. We try in all experiments to do this in one day, and in a portion of the day after the dew had gone from the earth; we try to get it as nearly in the same condition as possible, and if necessary hire extra help to insure this. There are accidents which happen —such as rains coming up—but those are things that no oversight can provide against. They do affect the experiment to some extent, but if these things are to be carried on for a succession of years, the probability is the next year one will be able to avoid this, and get such an average as will form a guide. The objection to the small plat has been stated: that if you make an error at all in weighing, or in the size of your plat, or in any particular, that is multiplied by just so many times as it is less than an acre if you take that as a unit. If you take a larger piece the multiplication of the error is not so great.

We had some experience in the matter of small plats. One of our farms in Chester county started before the one at the college, and before the one at the western part of the State, and they started some independent experimenting—sowing little plats of wheat of various varieties, and patches of one thing and another. It was found that these patches were very difficult to care for. Wherever we have small experiments the tendency is to increase the number, and it is scarcely possible to keep them all separate. The effect of that was that the superintendent, who was carrying on the experiments pretty much on his own hook, allowed shocks of wheat of different varieties

to stand in the field, and would thresh one and then another, taking several days in doing it, thereby occasioning greater error than would come in the having of large plats which were brought in and put in separate places in the barn, and not having so many of them. In regard to the way in which the plats should be laid out: I do not see exactly why the gentleman thinks it is necessary to cultivate between the plats. It seems to me, if the grass between the tiers of plats has an influence on one plat, it has that same influence on the other plat, and so the same influence goes on through the whole series of plats. There is the fact that we may use manure and we may not; inasmuch as this system of experiments is one that is only relatively compared, the same thing would be true if the plats were not cultivated. It would not bring in any greater error, probably, than if the plats were cultivated. The keeping in mind of this one fact, that our results are only relative, I think clears up many of the objections. Also in the feeding of animals, this same thing holds good. I have only taken up the matters that have been suggested to me by the remarks of the gentlemen here, and given my views upon them, as I understand that it is the object. In this matter of feeding stock, it seems to me if we could place equal weights of stock in different pens—pigs, for instance—instead of having a single one in the pen, if we could place a number in one pen, and then a number in another, that would give a better result, because we divide up a greater amount of increase. When we come to show the effect the feeding has had upon the animals, we divide it up, having a greater number of pounds to go on, and we get a more correct result in the division.

I believe this is all I have noted, to reply to. In this whole thing, I think there are three principles necessary to be kept in view, in instituting these experiments; that there are three grand divisions into which these experiments can be divided, one of which is to show the rotation of crops and method of culture. Those two things are intimately united. They are things that are of practical value to farmers. They wish to know these things—the methods of culture and the proper rotation of crops. This, I think, is a proper subject for agricultural experiments.

Another is the experiment in different varieties of grains, seeds and vegetables, showing which are best adapted to certain soils, the ways of developing and the varieties that suit certain methods of cultivation. The next is in testing the qualities of different manures. These three things are the great questions of the day in agriculture.

Professor Daniels—The remarks of Dr. Miles, I presume, are much more to the point than any I shall make, as my experience has been mostly under Dr. Miles. I suppose you wish me to state something of what we are doing in regard to experiments.

The Chairman—The topic which is before us, recommended by the committee, is the experiments which may be tried in common by

the several institutions in the country, and the methods of trying them.

Professor Daniels—I have been very much interested in hearing the remarks that have been made, and I am sorry that I did not understand exactly the points they were reaching—the experiments which may be tried in common. But I would agree with both the gentlemen who have spoken in this: that experimentation is difficult to carry on, and definite conclusions are difficult to reach, on account of the great number of things that are brought in and the great number of elements involved in the experiment. The weather, the different character of the seasons, different conditions and different processes, as applied to the soil—all these things render it exceedingly difficult, and no absolute results can be obtained. But they must be relative, as it has been stated. The experiments which can be carried on, and best carried on generally with uniform action through the colleges, are, I should think, such as have been stated; the feeding of stock, and the general results that may be obtained from feeding stock in different, definite, prescribed ways, and also in the methods of culture, and in regard to varieties. In regard to varieties of our crops, perhaps nothing so absolute can be obtained, on account of the difference in the climatic conditions in the different portions of the country in which the experiments have been conducted. Our experiments mostly have been these, so far: The comparison of the different varieties—for instance, a comparison of all the varieties of oats that we have, and all those which we could obtain; a comparison of the different varieties of potatoes, and so forth; and the testing of some varieties of winter wheat and spring wheat, and different methods of culture, and especially some of the simple matters. But under the circumstances in which we are placed, with an income which is small, we have not been able to do much, and the Agricultural Department is simply one department of the University. We cannot apply all our energies in one direction. We look more to institutions that have devoted their energies more especially to these matters, having more money to expend than we have had; but any series of experiments, however, that the Convention would recommend, we should be glad to carry out to the furthest extent possible.

Dr. Miles—I would like to make a remark or two, to correct a misapprehension and draw out some further information. I understood Professor Hamilton to say that although an experiment might be conducted carelessly, and the result not accurate, if an average is taken in large numbers, it would give satisfactory results.

Prof. Hamilton—I did not mean to say "carelessly"—not by any means; but after as great care as possible has been exerted, the result is not correct, and the only way to get accurate results is to compare, and in the end get some law that is general and as near accurate as may be.

Dr. Miles—I understood you to say the experiments might be tried in a certain way, and although they were not accurate, yet by reason of the large number of them, we might get at great results, which is the only means by which accuracy could be secured. It seems to me if that be the position, it is going to lead us astray at once. We must understand it is impossible to secure absolute accuracy; if it were otherwise, the matter of experiments would be an easy thing, and we could go right along with it. But if we cannot secure absolute accuracy, it seems to me we must avail ourselves of every means to reduce the error to the smallest possible amount, and even then we may find it difficult to draw satisfactory conclusions from the experiments. I apprehend we have been misled in our attempts to draw conclusions from averages of a large number of experiments that have been made. I think we can not get accurate results—we can not get at any principle, at any law—by comparing experiments that are filled with errors, provided those errors are of any considerable amount. For that reason, I would insist upon being exceedingly particular on every point in conducting experiments. I have made this subject a study for a great many years, and I have collected a large library upon this subject. All the agricultural experiments I have been able to lay hands on, I have brought together, and have examined and compared; and the more I study the published experiments, the more I am in the dark in regard to any underlying principle. I can see fallacies that are of very great consequence. I can see omissions in the statements which would lead me to suspect that proper precautions had not been taken.

In regard to cultivation between the plats, I, perhaps, might have stated the matter a little clearer. If you have spaces between the plats, they are there for the purpose of separating the plats, and if you have something growing there, it is not a fair separation. If weeds are allowed to grow, some of the spaces would contain more than others. What I mean by cultivation is, the space should be kept clean and free from weeds, and nothing be allowed to grow upon them, because if you leave plants to grow upon them, they will extend their roots to the plats and defraud the crops by drawing the nourishment from them.

In regard to putting up cattle and feeding: If the conclusions I have drawn from our experiments are correct, the putting of the same weights into pens would not answer the purpose. I might have in one pen 500 pounds of very small animals, and in another 500 pounds of animals considerably larger. But if you are taking the larger class of stock, there might be 1,000 pounds in one pen, consisting of five animals, and 1,000 pounds in another, consisting of one animal. You could not compare them if there was a difference in age and a difference in condition. The matter of individual peculiarity of animals is a very important one. I found where I had two or three animals in a pen, there was no increase. In another pen adjoining, where there

was the same number of animals, there was a remarkable increase. I said, "why is this?" I weighed the animals separately, and found one animal was losing and another gaining. If you want to know the value of any feeding substance, it will not answer to take the averages of the animals. The amount of food required to produce a given increase is what we want, and I would have each animal's food by itself, so that when that animal made no return at all, I would know it was out of condition and not a fit subject for experiment, and throw it aside. There is another reason why I would put animals in separate pens. They do much better. When the animal gets contented in the pen in which he is placed, with none to molest, he eats his food quietly and lies down. Where there are two or three together, perhaps one is quarrelsome, and is continually disturbing the others by not allowing them to eat or to lie down. It is with animals as it is with persons. One is restless, and another is inclined to be quiet. When you have a large number of persons together, you find it exceedingly difficult to keep the room still. It is so with animals. One animal gets nervous and keeps the others confused and unsettled.

Professor Hamilton—I would like to make one remark. I took it for granted, when I made the statement in regard to putting a number of pigs in the same pen, that the same care would be exercised as when there was but one animal in the pen.

Professor Prentiss—I have had enough experience, and seen enough, to convince me that the difficulty in the way of conducting experiments is even greater than has been set forth by the remarks this afternoon. The materials and the forces of nature are so varied, and life is everywhere so variable in plants and in animals, that we can not tell whether to attribute certain conditions to the plants, or the animal. Dr. Miles referred to what he calls the individual peculiarities of animals. Botanists recognize very great peculiarities in plants, that they readily see and recognize, but can not describe; it is what Linnæus has termed "physiological peculiarities of plants"—some hidden mystery about them, something that controls them, something that we see, but do not yet understand, and probably never will. For instance, you take two seeds of an apple, apparently alike, and plant them. One develops into a tree, which bears a large, excellent fruit—a tree of vigorous growth and handsome appearance; the other develops into a small tree, producing a fruit of little or no value. Perhaps the condition of the soil and climate are precisely alike, and yet these differences are developed in the growth of the different seeds. The same truth applies, only, perhaps, to a less extent, to every plant that the farmer grows in a field, to every plant of grain in a field of wheat or corn. So, when we take these plants and subject them to culture, to see what method is most valuable, we can not tell whether it is a difference in culture that is productive of the diffsrent results, so much as individual differences in the plants themselves. So, in every way in which we look at these experiments, diffi-

culties present themselves. I would not infer that all experiments are of no value, because I believe they are of great value; but the experience of a single year I consider to be valueless. The experiment must be repeated time and again; and finally, notwithstanding the difficulties are pointed out, I believe a result would be obtained which, to a certain extent, would be considered as a general law. The proposition which has been made in reference to having the different agricultural colleges conduct the same experiments, I consider to be in the highest degree valuable; because the more these experiments are tried, the more varying the conditions, and taking them year after year, the more sure would be the results. So, as I look upon the matter, I believe the value of experiments in this country has just been commenced, or rather the experiments that would prove of value are just commencing, and the step we are about to take I consider to be of the the utmost value in this direction.

Dr. Detmers — We have just listened to very able remarks in reference to the conducting of these experiments, and I wish to add but a few words. There is one point I consider to be of very great importance, and that is the different agricultural colleges uniting in their efforts in this direction, to demonstrate and to find out what influences the soil and climate in different localities have upon the development of our different domestic animals, and even upon the different breeds of domestic animals. It is well known that in one part of the country, fine handsome horses are produced, but the cattle in that locality amount to but little. In another locality they raise excellent cattle, but the horses are inferior. In another, they raise the finest kinds of sheep, and in another the sheep do not succeed at all. We may know the cause, but not thoroughly enough; and this would be a very good object for the united efforts of these agricultural colleges. For instance, if you ask a dozen different men what is the best breed of cattle, you will receive as many different answers. Some will prefer one kind and some another; one prefers the Devonshire, another the Ayrshire, and so on; all are liked more or less. It would be of great importance to explain not only to the agricultural student, what are these different conditions and varieties, but to the agricultural public, what makes one breed thrive so much better in one locality than in another. We know it is almost impossible to raise sheep successfully in low, wet ground. We know that horses thrive better in a high and dry country than in a low and wet one, although they may get a great deal more weight in the latter. But there are many points which might be explained by proper and rational experiment.

A good deal has been said about feeding cattle; and I want to mention one simple point, established by empiricism. It has been found out that where we attempt to fatten animals when kept separate, they never thrive as well as when two or more are kept together. It seems that two animals, or three or four kept together,

eat better. They are somewhat jealous of each other, and each afraid the other will get more than its share, it seems; and they eat better, and consequently thrive better on that account.

President Denison in the chair.

Dr. Gregory—The committee have taken it for granted, I suppose, that all the agricultural colleges and institutions, or institutions that are teaching agriculture, are conducting experiments—it is of course understood, the agricultural colleges—not for the purpose of experimenting first and foremost, but for the purpose of teaching agriculture, or the branches of learning relating to agriculture, and it has not been uniformly accepted that the agricultural colleges are to be experiment stations. They are not necessarily experiment stations. One of the questions for us to settle is, how far they can be made experiment stations, how far their forces and funds can be diverted for this purpose and used for this purpose. In Europe the agriculture experiment stations are sometimes connected with the institutions, but not always. If I am rightly informed, there are some thirty-three different agricultural experiment stations in Europe, under the charge of some sixty agricultural chemists, besides other parties assisting them. These experiment stations, some of them at least, are found connected with the institutions. Those that I saw myself were always connected with them, because I did not turn aside to visit any of those that were not; but many of them, like the celebrated experiment station of Lawes and Gilbert, are not connected with any of the institutions of learning. We know this, that the country is demanding of the institutions that they shall conduct experiments. The agricultural public expects us to conduct experiments. They are constantly calling, through the agricultural press, at agricultural conventions and otherwise, upon these colleges to help them to settle questions relating to agriculture. Whatever might have been claimed at the outset to be the duty of these collges, I trust we shall fulfill a public demand and duty by instituting experimentation. At least it seems to be the judgment, I think, of the gentlemen present here, and all I have known in connection with the agricultural colleges, that experiments shall be prosecuted. What has been already said here will, perhaps, sufficiently lead us to infer the great difficulty attending these experiments. But we have been told long ago that there is no excellence anywhere without great labor. The truth does not lie on the surface always. It hides itself in the depths. It is to be sought for with great patience, and with great care, and great study. When it is found at last, be it after ever so long a search, and after ever so great expense, it will richly reward the seeker. Now, in the solution of the problems in agriculture, the discovery of laws in agriculture—for I suppose that is the object of the experiment, and not merely to gratify the curiosity of the experimenter, not merely to get at some half-way results, like weighing a thing by taking it first in one hand and then in another, and then giving a guess—it is possible to deter-

mine, somewhere approximately at least, what are the facts, and ultimately to reach a law.

What are the laws and forces which enter into any agricultural product, animal or vegetable? What if they are many and complicated? Are they more so than the forces that have entered into the other results and deductions that men ultimately have reached, and determined the laws of? We should remember this thing: If we can get one single element reduced to its law—if we can, in one single case, discover a law that is fixed and invariable, and has the force of a law in a multiplicity of things—we have put, as it were, a streak of sunshine into it; we have got one fixed element in the problem, and everything else will be readily solved.

As far as Dr. Miles' experiments which he suggests, and very wisely, in the matter of feeding, you can take simple corn in its various forms, and, by a series of experiments carried out, you can ultimately arrive at something like a law in regard to the effects of feeding an animal on this one article of diet. May you not ultimately reach a law of animal feeding, and growth, and fattening, which you will carry elsewhere? The multiplicity of forces that enter into these experiments, to my mind, only prove this: the necessity of combination and co-operation. Suppose, for instance, that the Agricultural College in this State would try certain experiments as carefully as we can. We are trying them under a careful experimenter, who is present, and we may ultimately, in the course of years, reach a conclusion, as we think. Somebody in Pennsylvania tries the same set of experiments, and he reaches a different result, revealing to us what we alone should not have suspected, perhaps—that there were climatic differences, or something or another that modified the result, and which therefore vitiated our supposed law, and compelled us to start afresh before we dared to publish the results of our experiments to the world, as an established agricultural law. It seems to me the argument is sound in the matter of the proposed co-operation. How far this co-operation can go will be determined by the nature of the experiments. We shall see how far we are under different conditions, such as will compel us to make allowances for our own and other experiments. To me it is a very serious practical question, and I suppose it is to the gentlemen connected with these institutions. The public are expecting certain things of us, and demanding certain things rightly of us. They ask us to do, perhaps, what we can not. They ask that we shall so experiment as to discover for them how they may cultivate corn to the best advantage in this and other States; or how to feed animals, or what varieties of corn are best worth cultivating. They ask us to enter upon a set of experiments to determine it.

Suppose you in Pennsylvannia, or in Wisconsin or Michigan, go and work isolated and alone, and the rest of us wait until you have accomplished your experimentation; you reach a result and you

publish it to the world, and the first practical farmer that makes a trial of that supposed result and law, discovers that it won't hold in his community, and at once throws contempt upon your agricultural science, and convicts you, as he says, of not knowing what you are about, and of pretending to discover some things which are not true. If, instead of conducting the experiment in isolated schools, and not helping each other at all, we are prepared to say that a set of precisely similar experiments, arranged by the same man, and conducted according to the same rules, and as far as possible in the same manner, produces such and such results, we defend ourselves against unjust criticisms at least, and put ourselves and the whole public with us on to vantage ground, for giving new investigations, if no more. We are at least all agreed in this one thing, in which Herbert Spencer says: "Scientists and religionists are all agreed in, if not in anything else, that there is something to be known, there is something to be discovered." There are some questions to be asked, but I doubt whether you are prepared to state distinctly and fully just what the questions are that are to be settled. Strip them naked and set them before us, and see if we can determine precisely what is to be experimented upon. We want to experiment in order to learn how to experiment, and to know what road we want to travel and what results we ought to aim for. What we want ultimately to reach is a law—not a fact—but law. Ultimately, truth; but what law, what truth? Who will tell us? Will Dr. Miles? I do not know of any body better prepared, but I do not know whether he can tell us to-day.

I wanted to call attention to a practical matter before us. I hope after this discussion shall have proceeded as far as the Convention shall choose, that the subject-matter will be referred to a committee, with directions to report, if possible, before the close of the Convention, distinctly, some one, two or three experiments, perhaps one or more in each one of the three departments which Dr. Miles has given us, which the Convention recommends to the several institutions to try; that they may begin to work on common ground; and when we meet another year, we shall be able to compare notes, and then have reached our real point of starting.

I want to add one word here, if I am not already trespassing on your time. It seems to me we can not too much insist upon the utmost care and precision, so that we may eliminate, as far as possible, every single source of error from these experiments, and reach some results that can be looked upon as derived from the causes suspected at least. Nothing struck me more impressively in agricultural experiments going on at the European stations than this: the nicety and care with which these experiments were being performed. I remember at Munich I saw some plats, less than those recommended here, in which not only the seeds, even when they were grass seeds, were measured, but they were carefully weighed and counted, and at the head of every plat was placed the number of seed. The profes-

sor told me that every result that was obtained from that growth, was weighed, root, branch and fruit, hoping ultimately to reach more clear and distinct results. Now we all know that science never began to make advances until it called mathematics to its aid. When it began to weigh and measure, and count and number, then science began to make progress. Science in agriculture can make progress no better than in any other branch, unless it comes down to measure and weigh and count, and applies mathematics to get precise results, and measures and weighs, as far as possible, all the forces that enter into it. We see the difficulties, but we can not help ourselves. We did not make them. We are to encounter them. If I heard to-day for the first time, the sentiments of Dr. Miles and Professor Hamilton and Professor Daniels, I should shut my eyes almost in perfect despair; saying, there is no use, the thing is so complicated. But when I remember that every other science was at the beginning just as much of a riddle as this, and only solved by long and patient study; when I remember that, I still hope there is something to be learned in agriculture, by the same patience and the same processes.

Prof. Swallow—I think you will find there will be some difficulty in extending the experiments to all the colleges in the country—to some of them, at least. As a general principle, when we are experimenting to discover new laws, we shouldn't override the laws that are well known and already discovered. I was reminded of this by some remarks made about putting animals in separate pens. I suppose there is no law so well established as this: that solitary confinement with many animals is very deleterious. It is as much so with animals as with men. I suppose if the giant in the old story had tried to fatten his men in solitary confinement, he might not have succeeded so well. I remember separating two horses that had been together a long time, and continuing one on the same feed; but he fell off all the time until his mate returned. I do not know how you will feed them so as to get accurate results. Sometimes, if you put animals together who do not agree, as will often be the case, there will be little parties of them that will naturally run together. If you could get those parties together and feed them, that would be better than if they were mixed with those for whom they have no affinity, as you may say. It would be difficult to manage this matter; I would rather regard the social principles, for we know it is a general law, than to disregard it.

I want to call attention to one thing—the question as to experiments in feeding. Experiments made in Maine and in Louisiana are almost worthless, unless you take corn from Maine to Louisiana, and from Louisiana to Maine, so as to feed them on the same corn; for the corn in Maine is worth much more a pound than that raised in the South. They can not raise the corn we do, and we can not raise theirs; and the comparison of experiments made in such localities would be of little value, although not so much as those in Europe.

They are almost valueless to us. What we want, and what our colleges want to do, is to each investigate the principles applicable to its own locality. You may prove, for instance, in Michigan, that in your sandy soil a certain kind of manure is the best for corn and wheat, and we try it off in Missouri, and it would be a failure. We know it beforehand. We place your barn-yard manure on the ground for wheat, and it will injure it; but on the sandy soil in Michigan it will be of great value; on some other soils animal manure will lessen the crop rather than increase it. There are certain things which you know, and we don't know. It seems to me we can do more by having a certain class of colleges whose relations are very near to each other as to soil, take up one series of experiments, and another class of colleges, having another kind of soil and climate from those already related, take another class of experiments—that is, have each take up a certain class of experiments which would come within range of its climate, soil and stock. I do not see, especially in the feeding of animals, that any experiments in Maine would be of much value to us in Missouri—the climate is so different. I do not see, on the other hand, that their feeding hay would benefit us much. We raise timothy and red clover as they do, but it is a different thing from theirs—as much as the corn is.

In regard to raising corn, for instance: You may try experiments with corn in Maine, and we try the same experiments in Missouri. The experiments are made with different varieties of corn, and we could scarcely compare them. They may raise less pounds, and yet more nourishment than we would. One kind of corn needs a little different nourishment from another.

I simply want to call attention to this point. I do not see how we are going to establish a series of experiments throughout the country on any point which has been spoken of, so as to make the comparison as valuable as it would be if they established, as I said before, a series of experiments with a few colleges whose conditions are about the same. Another thing: if you are going to conduct a few experiments by all the colleges, you and I will be dead before we know much about the results. People are in a hurry in these days; and if we can do a little something to aid those around us in such particular states, as we will have to do to avoid going up the spout, that will be the much better way. They are not going to wait for us a great while. People are too much in a hurry, and if the agricultural colleges do not do something soon, I think they will ask in vain for much assistance or sympathy. I think that would be the result. I believe I am not mistaken that the idea in regard to whether we are compelled to have experiments is not correct. I think the law contemplates experiments as imperative on the subject. I will not be positive, but I know this, that in our reports we are required by law to give the results of experiments.

Prof. Daniels—I concur in the remarks made, as to the difficulty of experiments, and I believe it is true, as has been said, that nearly all the experiments that have been made are useless as such—that is, useless as giving us any general law, or any data from which we can draw any conclusions. But they have been of use in this: that they have taught us where we must begin. There is another thing that I think is true—lamentably true—that the very men from whom we must look for opposition, and who will be continually against us, are precisely those men for whom we are laboring. They are looking for some immediate results. They expect, as I heard a farmer say, the kind of education from the agricultural colleges which will enable a man to take up a handful of soil and feel of it, and tell you all it is composed of. That is the kind of knowledge they are looking for, and those are the men from whom we are going to get opposition—the men for whom we are laboring. I do not believe that any man who has not been personally connected with careful and accurate experiments has anything like an adequate idea of the difficulty there is in connection with carrying on experiments. It grows upon me every year as I am connected with it. I have lost faith in the results I have obtained every year, because I see how slight variations affect the experiment. So I have not a great deal of faith in the experiments that have been performed, I do not care by whom, or where. But I know we are getting nearer and nearer to what will be true, and what we shall find to be true, and the only way to get at it is by patient, earnest work; and although we get opposition from the farmers, as I know we shall, yet we can only work on earnestly and faithfully, and good will certain result.

In regard to the remarks of Professor Swallow, with reference to a series of experiments being prepared for one section of the country, I think I see the fallacy of his reasoning. Let us take the example of the corn culture in Maine and Louisiana. The experiment that is being conducted in Maine may not discover a law which will apply to Louisiana; but if we conduct the experiment in a certain way, and we find that certain results, if we carry on the experiment with any other variety of corn in Louisiana, follow relatively, it only follows that the law, which we have been trying to learn, is a general law, and that it applies not only to Maine, but to Louisiana as well. It seems to me this shows at once how important it is that these experiments should be carried on generally over the country—over a greater area in order to get some data from which we can generalize—not laws that are local, but general laws which agriculture may look to as settled and definite laws.

Professor Hilgard—I agree with the gentleman in this: that the more we employ experiments, the more apt we are to come to general laws instead of local experiences. The matter of experimenting has been run into the ground. Experiments made by private individuals have been reported as general laws, or illustrating general laws, with-

out any basis for the assumption. It is that which makes a great portion of the agricultural journals worthless, and a stumbling block to one who is trying to learn the truth. Each man tries to put forward his own experiences as the proper course to follow in all cases.

There is one point I would wish to call attention to, as demonstrating the importance of not relying entirely on the experiments made in the old country, for the reason, the soils have been cultivated a long time, and a great variety of manure is used on them, and their history is not known. It has been stated by one experimenter, that it was impossible for them to obtain the average condition of the soils. In this country we are more favorably situated, and we have succeeded in separating our soils into certain classes readily recognizable. For these soils we can establish certain rules, which, so far as I am aware, hold good. The use of fertilizers has not been very extensive in this country. In Europe, the use of bones ground has been practiced for a considerable length of time. We all know that it takes a very long time to disintegrate bones. The way it is ground is of such a character that it takes twenty-five or thirty years to disintegrate it all. When it comes to the use of mineral phosphates, such as have been used lavishly in Europe, there is no telling when the supply will become exhausted in the soil. In the soils of the prairies it is comparatively easy to get a soil of uniform character; but I do not think the experiments in Europe are applicable to this country. In Mississippi we are able to class our soils under comparatively few heads, owing in a great measure to the general geological formation. It is the same in Indiana, as far as I have seen, but in many sections the disintegration of the rocks influences the native soils, and causes the difference, which can not be taken into account. I believe it is impossible to establish anything more than local laws. Great care should be exercised in the selection of the location of the experiments, and especially land that has been subject to long cultivation should not be selected for experiments, for it introduces an element which it is impossible to appreciate.

I confess, I cannot agree with the strict separation that has been suggested between experiments of a practical nature and those of a scientific nature. One gentleman suggests we should come as soon as possible to the point, and do something which will tend to check the opposition we are apt to receive. I believe with Professor Daniels, that we must face the music, and stand up and say, we are not able to give general rules that will hold good for all parts. The practical men, so called, are really the most impractical men in the long run. We must educate the people, show them the difficulties in the way of immediate results, and the good we hope to accomplish by patient and continued effort. It takes time to do all this. An experiment of ten years is not a long experiment, and yet, how frequently has it happened that the eleventh year, that which seemed to be certain and fixed, has failed. The Louis Weeden system, which has been so much

praised for a dozen years, has finally failed where it has been continued for a long time.

I am pleased with the views of Professor Hamilton. I think averages, both in practice at one and the same time, and of a great number of things, is the only mode by which we can secure really practical results. But this opposition, I think, we must leave out of consideration, and if we wish to do good, we must face it bravely. This opposition I have encountered perhaps in as great a degree as any gentlemen present. Before the war, I investigated the soil of Mississippi, to learn from what formation it was derived. The question that arose, wherever I went, from practical men, was, "Do you pretend you can raise more than I can, or know better how to manage a plantation?" I do not think we ought to count these people in. We will have to fight them and might as well make up our mind to it. Let us go forward in the true mode of inductive experimentation; that is the only security for the colleges. I think the difficulties can be overcome by experimentation; but do not let us have any putting forth of general principles, or what may be from local experiences. I will not detain the Convention any longer; but I am confident we must not look to anything like a compromise with those who would push us on to declarations, as principles of things, which we have not sufficiently tested.

Dr. Miles—As there is no one else to occupy the time, I would like to say a word or two more. The separation of animals in feeding experiments has been objected to on what seem to me to be purely theoretical grounds. It is easy to make an assumption, and from that, reason to erroneous conclusions. We are all aware that solitary confinement is not profitable, yet from that fact it would hardly be safe to reason that we could not separate animals for experimentation. The question really is, how have we found it in our experience in the treatment of animals?

The facts are simply these, so far as my experience goes: that the animals in a pen by themselves are a great deal more quiet, and they thrive better, and do better every way, than where there are a number of them together. Take the case that Professor Swallow suggests, of animals that have been associated together for a long time, and then separated. Take a span of horses that have been together all their lives, and then separate them in the expectation of getting a good result in feeding them, and you will be very much disappointed. I have tried that—placing a number of animals together, and then separating them after they became acquainted with one another, and when they were separated they fell away at once, notwithstanding there was an increase in their feed. In selecting animals for experiments, it would be desirable to get those that have not these strong attachments. If there were two or three together, it would not be well to separate them at once, and commence experimenting, but they might be first separated for a sufficient time to form new habits. We

keep a large number in pens by themselves, and they do not come in contact with other animals except occasionally, yet they seem to be as contented as those where there are two or three or more in the same pen. Calves that we keep in box stalls are better contented than those where there are two or three together; so that really this is not a question of theory, but is to be determined practically—how we can best promote the growth of animals.

In regard to division of labor in experiments, it seems to me that the argument is carried a little too far. We know it is desirable at the present time to make a division of labor. It is impossible for one man to master the entire range of sciences, and become an adept in each. Great discoveries have been made by certain men confining their attention to certain objects, and working them out. It is desirable, of course, to repeat experiments, but the mere fact of repetition does not insure accuracy. If your experiments are defective, you may repeat them through all time and never get a satisfactory result. That is the point that should be kept in mind; repetition is absolutely necessary in experiments, but is not the only element. Accuracy is of the first importance, and then the repetition of an accurate experiment is essential. That is, when developing a law or principle from an experiment, we must do it with all the precautions that can be used. The progress of science has not been on account of the multiplication of observations, but the increased accuracy of them, and the employment of more perfect means of observation. Our senses become more acute, and we are able to detect slight changes; then the repetition of a nice observation has given us wonderful progress in science. I would seek a division of labor and the benefits of co-operation at the same time. In this division of labor, I insist, in the first place, on the importance of confining our investigations to a single point. We should not try to mix science and art; we should not grow a crop of wheat, and then send a chemist to examine the soil, and draw a conclusion as to the manner in which the plant has grown. We have had too much of such science and investigation. How has progress been made by the scientific men, and what are the scientific experiments to which I refer? The chemist or the physiologist has wanted to know what particular elements were taken up from the soil by the plant, and in what particular form. How does he go at it? He takes distilled water and puts in certain definite substances; he shows what they are, and then grows his plants in that; he has certain accurate conditions in his experiments. The scientific man must control all of the experiments in his investigation; he must control all of the conditions of the experiment in his investigation, or he will not be successful as a scientific man. It will not answer for him to have control of two or three conditions, and then guess at the rest. Here is the difference between investigation in science and art. In the investigation in art, we can not possibly control the conditions; we will control what we can, and then must compare observations for a

long time, to get at the probable elements of error. Where we are drawing deductions as to the results of experiments, we must make allowances for the elements of error which underlie all our experiments. The distinction between the two lines of inquiry is very clear. In art we want to get at certain rules of practice. An experiment that would be satisfactory, so far as that is concerned, would amount to nothing, so far as increasing our scientific knowledge is concerned. Scientific investigations must be made with more care; one great reason why such a change has taken place in our agricultural chemistry has arisen from the fact that former experiments in chemistry did not control all the conditions; they had not apparatus sufficiently delicate to detect all the slight changes which took place. Just as long as we work in this direction we are going to meet with disappointment.

In regard to the quality of corn in Maine and St. Louis: I do not know there is such a difference in the feeding quality of this corn. I am not aware that the matter has been tested experimentally. I am aware there is a difference under certain circumstances; an analysis will show a difference in the quality, but it does not follow there is a difference in the feeding quality of the grain. We have been running along for a number of years with the theory that the composition of the grain was an index of its nutritive value. No one now will pretend to advance that doctrine who has examined the latest researches in physiology and chemistry. But, admitting there is a difference in the corn of Maine and St. Louis, what we want to get at is this: the result of feeding in Louisiana or Missouri under the same conditions precisely, and the same care taken to secure accuracy. If the corn from Maine was taken to St. Louis, there would be a difference. There is an element of error underlying that we can not get at. We may not reach it in our life-time, but we must determine it before we can get at principles that are safe for us to follow in practice. If experiments must agree exactly in order to be of value, we may as well stop experimenting, for you will never get any two experiments to agree precisely, because you can not control all the conditions. But we can get at the general principle after eliminating the error. For instance, I wish to know what the effect or value of a certain commercial fertilizer is. Should I apply it to one plat, I should have to examine a large number of unmanured plats and find their variation, and then I may compare the unmanured with the manured plats. But in order to get at the value, I must deduct the variation of the unmanured plats. We can only make approximations toward accuracy, make the experiments as accurate as we will. If we have the experiments tried under the same conditions in different localities, we have the means of comparing them. I have been for years collecting different experiments for the purpose of comparing, in order to get some underlying principle, and my difficulty is here: each one is tried in just a little different manner from the other, and there is no chance to com-

pare them. I attempted a comparison of Lawes and Gilbert's feeding experiments with my own. He took pigs nearly grown up, and fed them for eight weeks; we took young pigs but an hour old, and raised them, first feeding them milk and then corn meal. We got better results, so far as the feed was concerned. When we took corn meal, we did not try all the different kinds, but confined our attention to milk and corn meal. When I came to compare the result, they differed materially; yet, notwithstanding his experiments were tried in England and ours here, and he had corn meal that was imported, I found a very marked agreement. They differed, and yet they agreed in principle. They agreed in this: that the animals consumed more in proportion to their weight in the earlier stages of the experiment, and gave a greater return for the food consumed, than afterward. They are experiments wide apart, and each taken by itself would be, perhaps, of little value, but together they corroborate one another.

There are many points I would like to bring up. It will not answer to experiment for the sake of our bread and butter. We must go at it as earnest scientific men, seeking to develop the truth, and let it make no difference who is pleased or displeased with the result. We must get at it in this spirit, regardless of outside clamor. I know that farmers demand of the agricultural colleges impossibilities; I know they are expecting immediate results. A person said to me, two years ago, "I do not think much of your agricultural colleges." I said, "I am not surprised." He said, "Why?" I said, "because you are expecting something impossible from it. You think we claim we can take a green boy out of the city, knowing nothing about it, and give him a little agricultural chemistry and physiology, and then turn him out qualified to instruct old farmers." He said that was about it. I told him we believed and claimed nothing of the kind. Agriculture must be studied, and our rules must be based upon experience.

Prof. Swallow—I wish to say one word. I seem to be unfortunate. The point I wish to make is this: I may be wrong, but I wish to show that twenty experiments, with twenty elements of error in them, are not so good as two with no elements of error. That is the idea. We have forty colleges in this country making the same experiments, and in one-half of them there is an element of error which we know must be there, and the result will not be so valuable as if ten of these colleges were making the experiments without this element of error. No man would accept it as conclusive. You may as well say you could feed one animal on wheat and one on corn, and the results would be the same. I want to get at results as soon as possible, and as men employed by the State, we are bound to do this. My idea was, we could get at some results more rapidly by having a sufficient number of colleges take up a certain class of experiments in which they could experiment without any necessary element of error, that we know of. I say you would get no more accurate results by having other colleges perform the same experiments.

There is a popular idea that we must do something for the public, and I think we can do a great deal. I have been accustomed to say, for a great many years, there is something for agricultural colleges to teach, even now. There is a vast amount of knowledge that our farmers do not possess, and which many of our men do know, and which the colleges ought to be prepared to give at once. I would not be misunderstood in this. I am for going ahead and finding out something else, while we are doing this. I suppose this is a meeting—a consultation as to how we may best do that. Although Prof. Miles thinks my idea about the social qualities in animals is a theory, yet the world of naturalists have been laboring under that theory for these many years. I suppose by calling it a theory is meant that it is not a matter established in science. I do not know why it should rather be called a theory than a fact. My reason for making that remark was simply this: I wished to avoid in the experiments any element of error. The gentleman has told us how he provided against that element. He took the animals young, and taught them to restrain their social qualities, the same as they do the monks and hermits. When they want to make a man a priest they separate him from the women and keep him alone. It is doing what I saw he ought to do: be cautious about admitting elements of error into the experiments. I hope we shall come to some results which will be of great benefit to us as a whole. I came here because we are just trying to begin. I expect to be benefited more than the rest of you. Some of you have been at the work many years, and I will be able to learn by your experience, and in that way I expect to carry away more than I brought. Some of you, I hope, will carry as much.

The Chairman—The question has been raised, and is fundamental, whether these institutions are bound to experiment at all. The only reference in the law of Congress is in regard to the annual report. It defines in section four, that the main object shall be to teach such branches of science as are related to agriculture and the mechanic arts. Under section four, article three, it provides that an annual report shall be made, recording the progress of each college with regard to improvements and experiments made, with the costs and results—seeming to imply, but not necessarily, that they are to make experiments.

Dr. Detmers—Several remarks have been made in reference to the feeding of corn raised in Maine and Louisiana, and the difference in the grain. I admit there is a difference, but that is not the only thing that causes a difference in the results. There is a great difference in the climate of the two places, and that affects the physiological condition of the animal. The dampness or the dryness of the climate, the temperature, and perhaps a great many other things, have to be considered in making the experiment.

Dr. Miles—I will make but a single remark. Prof. Swallow and myself are agreed that we are anxious to get at the result as soon as

possible. We only differ slightly as to the way. One object I had in proposing the method of conducting the experiments was, that it would save time and get at the results sooner. I agree with the Professor that it would be better to have one experiment without any error, than twenty with error. I will go further than that. I would rather have one without error than twenty containing error. The difficulty is this, however, and is one we must face: We can not make a feed experiment, or an experiment in feeding, without it contains an error. But if we co-operate in trying the experiment, we will sooner get at it, owing to the manner in which the experiment is conducted. I might experiment this year and get one result, and another next year. I do not know whether the variation is owing to differences in climate or not. If it had been tried at two different points under the same conditions, it would be better than some experiments tried two years in succession on the same ground. If the subject is assigned for me to settle, I might go on for fifteen or twenty years to do the same thing over again; but if twenty of us take hold of it, we can go along four or five years, and when we get one thing disposed of we can take another.

Here is another point: Let each institution try as many of these experiments as it can, and just such as it chooses to try. If there are those that are strong enough, with means to devote to the matter, so they can keep on with all of them at the same time, so much the better; but it is better to try some experiment than do nothing. We must not expect to get absolute accuracy, but to find the element of error, so that it can be eliminated. Even some of the most perfect instruments for philosophical investigation and observation are very imperfect—as the thermometer, the barometer, and many other instruments; but tables are constructed for the correction of these errors, after observation and trial, and results are reached which are practically accurate.

Prof. Swallow—There is this thing to be considered: that the experiments are to some extent limited to particular sections of the country. For instance, we want experiments in cotton; but you have to limit them. That will give the idea. We must have general experiments, and then special.

Mr. Flagg—I want to say a few words by way of preface to the offering of the following resolution. It is getting pretty well along in the day, and I suppose any conclusion we may arrive at should come as speedily as may be:

Resolved, That a committee of five be appointed to report to this meeting a set of experiments recommended for trial at the agricultural colleges in the various States, with detailed statements of the methods of performing them, so as to insure all possible uniformity of conditions at each point.

The discussion before the meeting this afternoon has been as to what would be the proper experiments to be tried in common by the various agricultural colleges represented here, and the proper method

of performing them. We have heard at considerable length from Dr. Miles, and there has been considerable discussion as to the practicability of doing it.

I should like to go back and consider to some extent the various subjects of experiments, which I think would properly come into the hands of the agricultural colleges of this country, and also consider to what extent we should take those up as a body, and endeavor to perform them in common with one another. I recognize the fact that there would be a large number of experiments which each class would have to try for itself—experiments which would be peculiar to their soil and climate. Of course we do not expect to try experiments in growing sugar-cane in Illinois, but there are such general crops as corn and wheat, affording abundant scope for investigation. Many of the cereals can be cultivated to a greater or less extent, nearly all over the country, and uniformity of condition can almost be secured. The corn of Maine may be planted in Louisiana, and at the same mean monthly temperature as in Maine, and the conditions in that case, it seems to me, would be perhaps nearly uniform—as near as could be—with the exception of soil and climate.

What I was going to say is this: there are a large class of observations and experiments that may be taken in hand by agricultural colleges. We have the meteorological observations of the Smithsonian Institute, and those which are now being made in behalf of the signal service, and they ought to be extended and made much more than they have been in behalf the agricultural interests. The agricultural interest is more important than the commercial. We have a large series of experiments of which no mention has been made. Take the experiments in light, heat and electricity, and their effects on vegetation. You will remember the experiments of Prof. Stewart, which would tend to show that electricty may have an important bearing on the growth of plants. The different effects of heat, moisture and light have been but partially investigated, and there are a great many experiments of that kind throwing light on these various subjects. It is one of my ideas that ultimately, if not soon, we shall establish at each of our agricultural colleges an agricultural experiment station, similar to those of Europe. I think that is absolutely necessary to agricultural advancement. We know what Johnson intimates in his preface as to "How Crops Grow," that the agricultural stations have done more to advance agricultural science, and even agricultural practice, than all else together.

In regard to getting hold of experiments which are popular in their character, I have entire faith that science will do wonders for agriculture, although at the same time I recognize the fact, that our agricultural colleges are dependent upon the money of the people for their support, and we must recognize the wants of the people in such a way as to secure their confidence and their aid; and, looking at that, it has been my own feeling, to a great extent, to endeavor to

popularize agricultural science. I am strongly in favor of the proposition which has been made here in reference to securing the performing of at least a few experiments in common. I am aware of fhe difficulties under which many of our institutions are laboring. Our own college in this State secured at the last session of the Legislature an appropriation of $3,000 a year, for two years at least, for the special purpose of making experiments. I know many institutions are not so well off in that respect. The Cornell University, of course, has an immense endowment, and is practically independent. But, recognizing the lack of means of others, I should hope these experiments will be simple in their nature, and carried on with as little draft on the treasuries of the various colleges as possible. I can see that it is possible to attain in one year, by the use of all the agricultural colleges, the same results that would need twenty years of the experience of one. Suppose, for instance, we try some experiment this coming year at twenty places, and suppose the result is the same in all or in three-fourths of them, then we might consider the point essentially settled. As we are doing now, an experiment is tried, and results in a given way this year, and our farmers will nearly all say that settles the matter. One result would suffice them; but in the case of our agricultural colleges, I do not think we would try it less than half a dozen years before making up our minds, and it might be unsafe to decide in that time; but when twenty or thirty institutions try the same experiment in the same way, we can settle a great many of the practical questions rapidly, and, it seems to me, satisfactorily, and I hope it will be the feeling of this Convention. We have represented here about a dozen States, having agricultural colleges, and I hope that we will take this great step for the advancement of the agricultural interests, without any fear as to the results.

Mr. Murtfeldt—If I have anything to say, it will not be as a scientific man. If you are going to make a distinction between the practical and the scientific, I want to use the word "practical" here. Supposing an Illinois farmer wants to stall-feed a hundred head of steers, will it be profitable for him to build a hundred pens, and confine each steer away from the others? Would it be practicable to confine two or three hundred hogs each in a separate pen? Supposing the experiment that Professor Miles speaks of—that he found out that the animal that is confined separate will do better: can it be reduced to practice on any scale that will be profitable to the men who practice that kind of stock-raising? So with regard to the feeding of corn. I believe, in his first remarks, Dr. Miles said that he fed corn meal exclusively. That may do for hogs, but I should say it would not do for steers or sheep.

Dr. Miles—I said we had fed corn meal exclusively, but would recommend experiments in feeding whole corn.

Mr. Murtfeldt—I will take him on the same ground. Supposing he feeds corn raised in Maine, Massachusetts or Vermont in the grain,

and supposing the college in Missouri were to feed corn raised there, would there be a different result in experiments? As an unscientific man, but as a practical farmer, I should say there would be. Our corn is comparatively soft, while the corn of the East is very hard. With regard to manure, he says that it depends on the amount of feed consumed.

Dr. Miles—The quality.

Mr. Murtfeldt—That is the word that I wanted to get in, because I know that there is a great difference, whether the cattle are fed on corn, or timothy, or clover. I think that the experiments should have a practical bearing. If I recollect right—and if I am not right I hope he will correct me—he commenced feeding young pigs with corn meal. I want to know what practical good we get from proving the fact that animals, from the very hour of their birth, can be fed with corn meal. Supposing he had succeeded in that kind of experiment, what would the practical result be?

Dr. Miles—I am very unfortunate in being set up as a target here. In presenting a matter of this kind in a brief space, as we have to do, it is almost impossible to get in the details fully, and I have been misunderstood in every particular. Take the case that has been brought up by the gentleman from Missouri about feeding. Would it be profitable for an Illinois farmer to build a hundred pens to put in steers for fattening? I say no; it would not pay. That is just the reason why we are here. If he could do that and make it pay, we would have no need of agricultural experiments all over the country. What I would do is this: ascertain the value of the corn fed in different ways, so that the Illinois farmer may ascertain whether he is getting the full value of his feed. But these accurate experiments show he is not getting one-half of the value of the corn meal, or is not getting one-half of the return he should have had. And he will say I am not pursuing the best practice, and this high standard set up before me will be an incentive to a better practice. The gentleman says, I fed young pigs with corn meal from the start. I have not referred to these particular pigs that he has in view is this discussion. I have not had time to take up our experiments in detail. The facts are these: We have taken the young pigs and fed them milk until of suitable age to live on meal. But we have never made the sudden change from milk to meal. I put some a little sooner on the meal, with a view of ascertaining the result. The result was, that in treatment, which I consider unfair, to get at the physiological fact, the oil seemed to ooze out through the skins, but that has not been so except in that case. The mixing of this with other statements has tended to produce a false impression.

Mr. Murtfeldt—I did not mean to be unfair, but I wanted to put the point I wished to make as strongly as I could. I wanted the experiments being tried to have a practical bearing. I did not mean, in speaking of the building of a hundred pens for as many

steers, that the farmer should try the experiment; but after these gentlemen have established the fact that an animal in solitary confinement will do better than if it has company, it is still impracticable to go on and carry out that idea. It is not a practicable fact.

Dr. Miles—There is one point that has been omitted. In conducting these field and feeding experiments, we should pursue the same system, as far as possible, that is ordinarily practiced on a farm. But it is impossible to make your experiments exact, and conform fully to all the practical usages.

Prof. Hilgard—I am glad to see, from the remarks of Dr. Miles, that there is no difference between his views and my own, except he does not call science what I call it. The practical experiments are altogether scientific; that is, they are made on a scientific basis. What I wish to object to is, making the experiments without controlling, as far as possible, the circumstances, and among them those referring to positions, soil and so forth.

Dr. Miles—I must be allowed to make a few more remarks. I do not undervalue scientific investigation. I believe we should have, in each of our colleges, proper apparatus, and a man to conduct experiments for the promotion of science. The distinction I would make between science and practice might be illustrated still further. In feeding stock, for instance, we want to get at the money value; we want to know what corn is worth in dollars and cents. In the scientific experiment which has to do with the explanation of these results, we want to know the elements that enter into the constitution of these things, and in what proportion they are combined. There are two lines of inquiry. We must conduct practical experiments with the accuracy of scientific experiments, applying the same methods. The scientific man, if he understands practical matters, is more capable of improving a practical experiment than a man who does not understand scientific matters. But the scientific man who makes experiments in the art is not familiar with the details, in many cases, and he is looking at results; while in fact, we want to get value in dollars and cents.

The meeting then adjourned to 7½ o'clock P. M.

EVENING SESSION.

Convention met pursuant to adjournment.

The Chairman—The discussion now in order is the question of the relation of the industrial school or scientific school to each other, and the institutions to the country. The discussion is arranged to be opened by Professor Gilman, of the Sheffield Scientific School.

I will announce, as the committee called for, as the Committee on Experiments, by the resolution adopted this afternoon, the mover of the resolution, Mr. Flagg, of Illinois, Professor Miles, of Michigan, Professor Hamilton, of Pennsylvania, and Professor Prentiss, of New York. The Chair desires to scatter the appointments pretty widely over the country, and would like to have added one name from the more extreme West, and one from a State further East.

Dr. Miles—I move the committee be increased by the addition of two names.

The amendment was adopted.

The Chairman—I add the names of President Denison, of Kansas, and Professor Peabody, of Massachusetts. The discussion fixed for this evening is now in order.

Professor Gilman—Mr. President and Gentlemen: The remarks I have to make this evening will be quite desultory, as I had no expectation of saying anything. I shall endeavor to shape them so as to draw out other gentlemen I see here, partly by stating some points upon which I am wanting information, and partly by suggesting some of the topics which seem to me of wide and lasting importance to the country.

I observe, by your remarks, that the sentiments which prevail here have very particular reference to the matter of agricultural improvements. My interest in all this, and in the agricultural aspect, is very great; but by no means restricted to it. I believe there is going through our country, at the present time, a very great change in the notions of intelligent people, respecting the higher, middle and lower education. It seems to me desirable, whenever there is an opportunity occurs like this, we should talk over among ourselves, in the most informal manner, the principles which should guide us. I am afraid that what I shall say will seem to most of you as of very Eastern character, and I am frank to admit that my knowledge of these institutions is largely based on observations among those of the East; and as my object now is, in coming to the West, to learn what you learn here; so far as I can observe, you are much more free from routine, from the weights of precedent, and from long practiced usages, which may be good and may be bad. You are working out, with a

good deal of liberality, a great many of the propositions which we look at from a distance, and we are very desirous of learning how you are getting along with a great many of these questions, and therefore, what I have to say will, I trust, be of a kind to provoke comment and remark from you, rather than with the expectation of adding much to your knowledge.

In the first place, I suppose, among us, it is more the case than among you, that there are growing up among these national endowments to schools of science, which receive the benefit of the Agricultural College Grant, so-called, a great many private institutions, founded, many of them by individuals, and many of the most noteworthy character; and among them is the Bussey Agricultural School, which is connected with the Harvard University. The fund has been accumulating, and they are now making announcements what they will do. Akin to that is the one at Worcester, a great school of technology; another at Hoboken, a great school of mechanical engineering; at Dartmouth College they have two funds aside from their national college fund; and so I might go on. Some are of a lower grade and some higher. The question has arisen, how far these endowments, national or private, shall be allowed to exert an influence over the common schools; how far it is necessary to have preparatory schools adapted to them. Many of these questions have arisen which are not yet settled. I see that some remarks were made in St. Louis, of a severe and cutting character, bearing upon this matter. We are already discovering that public schools, or high schools and academies, are modifying their course of instruction. We have two schemes of study — one fitting boys for college, and the other for the scientific school. The change in the last two or three years has been very noteworthy. I merely throw this out to show you how completely I think this movement has taken hold of New England and the East, and how it is receiving recognition from State Legislatures, private individuals, teachers and parents. With us the matter is going forward. The first point is the spirit of entire friendliness to all sorts of learning. A few years ago, all the movements of practical education, so-called, were in the direction of hostility to all classical training. So far as I can judge, there is no such feeling now existing. I think those connected with classical colleges do not look with confidence on those schools. They do not feel quite certain that they are going to answer. They are a little afraid it is a sort of royal road to knowledge, and now and then I hear the phrase that this is a bread and butter knowledge that you are after, and they seem to think it is a college with the learning left out. On the other hand, we have the remnants of prejudice on the part of men who do not believe in book farming, and think that the teaching of mechanics in a school is putting learning in a workshop, where, they say, it does not belong. We have these two classes; on the one side, a little suspicion on the part of classical men, and on the other, a want of confi-

dence on the part of practical men; but we are beginning to reach such results that both parties are satisfied, and I think the war of hostility at the East is over, and the friends of education are agreed that both are good; the question being, what you want.

The next point I make is this: In all the New England States and New York, we have not been able to give a college endowed by national grant a special agricultural character. In Massachusetts, as you all know, the grant is divided into two parts; one-third was given to one establishment and two-thirds to the other, and two schools are built up—one of technology and one of agriculture. In Rhode Island, it went to Brown University; in Vermont, to the Scientific School of the Burlington University; in New Hampshire, the founding of a school in connection with Dartmouth College; in New Haven to the Sheffield School; in Maine they are building the Maine College, and in New York it is the Cornell University. In all these cases, I believe while there is a decided leaning toward science, theoretical and applied, in the structure of the colleges, there is also a very decided recognition of liberal culture. They are not, for the most part, to be in one specialty alone. With us they are not largely agricultural, although all recognize the agricultural element; all of them have professors of agriculture; all recognize a course of study in agriculture, and all would be glad to have agricultural students. But for the most part in New England, the tendency is to mechanics, civil engineering, to chemistry in its relation to industrial pursuits, and to the pursuit of science for its own sake, or as something which the world requires teachers in. So we are going forward, not in an agricultural way, but in the general direction of applied science.

In the third place, I would say that our tendency is largely to the giving of a general education, as well as a special technical one. I mean by that, while civil engineering, chemistry, agriculture and mining are taught, all of them are marked specialties, and there is a strong desire that the men thus trained shall be well fitted for any station in life, and a good deal of prominence is given to the modern languages, to the German and French, and especially to the English tongue, so that these men may know how to speak and write when called upon. There is, as far as time allows, a recognition of other subjects, like political economy, history, moral science, and things of that kind. These, however, are subordinate to the main special studies.

I would say in the next place, our great want in the direction of the colleges is good preparatory schools. There are in New England a few famous schools, like those at Exeter and Andover, for instance, which are admirable training schools for the ordinary colleges; but thus far we have hardly anything to prepare for the scientific schools. We want to strengthen our introductory schools. We all feel that the college proper, the scientific school and the university will not flourish among us until we have a very much larger number of these prepar-

atory schools, and of a much better quality; and most of us who are interested in these matters at the East, are working hard for the general education of the community, and for the improvement of the public schools, the high schools, the academies, and doing everything that will quicken the community into an appreciation of the importance of these things. We are obliged to go around the State in old settled communities, to lecture, take part in the teachers' institutes, call meetings of farmers, to arouse an interest in these important educational movements. I do not believe this new education, as it has been called, will achieve its proper work until a great deal of that enlightenment is done far and wide. These are a few points which we are wanting light upon, and I am glad to tell you what we are trying to do.

Coming to some other matters, I would mention first the question of how far manual labor in the scientific school is important, and how far it is unimportant. At New Haven we have felt that we could not urge it upon the young men; that if any one chose to work, and could find time from his studies, we would favor it. Many of our young men do work in vacation, and some in term time; but we think the time is so crowded with study, they would have very little opportunity for work. I do not know how we should feel if we were so fortunate as to possess a fund for the maintenance of a shop for discipline in mechanics, or having a farm given to us, or having a large amount of money. We have kept the time occupied with hard work. At the Worcester Institute of Technology, every young man is required to spend a certain portion of his time in the shop, and becomes there familiar with the use of tools, and learns to manufacture certain things, under the charge of the superintendent, which are sold in the market. The shop takes the place of a regular manufacturing establishment, and is known in the trade for the manufacture, among other things, of lathes, which are supplied at business rates for profit. In the Massachusetts Agricultural College, every boy is required to work Wednesday and Saturday afternoons, for three hours each, and he is paid for that work, according to its value, from twelve to twenty cents an hour, and he may work more, if he is inclined, as some are.

Another point that interests us a good deal is whether or not it is desirable to have a farm. I see how much is thought of it in the West, and I see how important it is, and I enjoy very much the things I have heard to-day respecting your plans for the future. I can only say of New Haven, thus far there has not been a call for it, and those interested in agriculture have rather avoided encouraging anything in that direction, because they have felt that with us the number of persons to be trained in agriculture is very small, indeed, and that the cost and expense of taking care of a farm, in proportion to our means, would be very great, and therefore, perhaps, to be avoided.

The military matter interests all of us connected with the national grant. For the most part, in our neighborhood, the military clause of

the bill is regarded with no particular favor, and many would be very glad to have it entirely abolished. At Amherst they recognize it, and the head of the school was a volunteer officer, and he enters into it with the greatest spirit, and has an admirably trained company, and would be glad if all the rest of the States of the Union would do as he has done. He is quite enthusiastic about it. You know in this manner occurred the remarkable fact that the agricultural college boys at Amherst, who are looked down upon, to put it mild, with a lack of appreciation, won in the University boat race. Yale did not row this year in consequence of some misunderstanding, and the Agricultural College bore off the prize by such long odds that one of the spectators, watching the boat coming in so far ahead, would not believe it was the winning boat, thinking they had not started fairly.

The Agricultural College folks are proud of it, as well as they may be. I was curious to inquire the reason of it—whether it meant brain or muscle—and I learned that the winning crew were the best scholars on the list; also that they were young men, most of them from poor and needy families, who had toiled with their arms all their days, and who worked a great deal at farm labor, and in various other ways had strengthened themselves, although they had only ten days of drill to win the prize. If they should succeed in doing it three or four years, they would not need any better advertisement, and the boys will leave the other colleges and come there. It has a bearing, I think, on this matter of manual labor and physical development.

We are very curious to learn what the experience of the West is in admitting women to the universities, colleges, and schools of science. The question has come up in New England this autumn at two universities, at Middlebury, Vermont, and Amherst College; and we are all of us looking with a great deal of interest to the experience of the West; though none of the New England colleges have thus far, admitted women to the privileges of instruction in any definite way.

These are some of the points which are interesting us, and I think we should like to hear the views of various persons here assembled. I should sum up all by saying that I believe there is going forward throughout the country a very great educational change; that side by side with the study of letters, and the classics, and the old, recognized branches of learning, other new branches of learning are coming up; that this study is pursued with us, without hostility to other branches, and that science is studied partly for its own sake, partly for the sake of its uses, and partly for its means of disciplining the mind; that these colleges, as they are established, ought to have in every section of the country a peculiar and definite character; that the school in New Haven should be different from the one in Lansing; the one in Amherst, different from the one in Urbana. It is desirable each region of the country should have that kind of scientific school best adapted to its wants, and it is desirable to confer with one another on all these minor points, in order to learn the best ways of

arriving at the best results. I can say that in New Haven, where there are two colleges side by side, the scientific has exerted a strong influence on the classical. We are able to do away with a great many traditional customs; the separation of the pupil from the teacher, and many other customs of the past. There grows up with us a much greater confidence on the part of the young men in their teachers, a familiarity with the young men on the part of the instructors, and out of it all has come a far greater love of study. The young men become enthusiastic, and are delighted with their progress and the freedom from the petty annoyances of college discipline, which in the old-fashioned colleges have heretofore given so much trouble. I think the whole matter is one that ought to be encouraged. The question is put to us, "What are the results? What becomes of those boys?" There have been some statements made in reference to the results at Amherst College, which, I was informed there, are erroneous; but it is not the question what the boys there are going to do. It is a question which can not be determined for several years. They must be out of college, and eight, ten or fifteen years elapse before we can tell what their work is. Time will decide. I think that is the only test that can be applied to these institutions, as to what sort of men they will train up. When we have young men who have been that length of time in service, the world will know what they are. At the Sheffield School, the character of the young men sent out is the best advertisement we have. A gentleman came from one of the neighboring towns a few weeks ago, and says: "I have brought my son to the scientific school because I have seen boys attending the classical and the scientific schools side by side, and that is the reason I bring him here." Others take the opposite course. They may have a strong tendency in the direction of letters. There is our hope: that the results of this training will be good, and such as not only to reward us, but justify the country in these large expenses, and very important modifications in the educational system.

Perhaps I have talked too long, but there is one further remark. There are some people who do not believe in these movements, and sneer at them as the "new education"—that is the phrase used by many, as if that was a novelty. The best way to answer them is to tell them that 300 years ago the phrase, "new education," was used in England and in Germany, to indicate instruction in Greek and Latin, which met with the same opposition that we find now. They said it was heretical, and would take men away from the church; but in process of time, they saw in Greek and Latin there were great elements of culture, and now they have entirely superseded the old metaphysical courses. As the world has grown, science has become a great department of human learning, and there are a multitude of things to be learned they had no suspicion of, two or three hundred years ago.

President Welch, being called on by the chairman, spoke as follows:

The Iowa State Agricultural College was opened in the spring of 1868. Its income, amounting to $36,000 a year, is derived from the leasing of the lands donated by Congress. The college building, which is 168 feet by 110, was erected by the State, and cost $170,000. The building, which holds 160 students, has been filled to its utmost from the beginning, and the surrounding country, though sparsely settled, furnishes homes for about fifty more, so that the entire number in attendance is two hundred.

The applications for admissions each year have more than doubled the attendance, and if the facilities for board equaled the demand, I judge we should have five hundred instead of two hundred.

The first year there were two classes, being a preparatory and Freshman class—about equal in number. Last fall the preparatory class was discontinued, except a few who failed of quite entering the Freshman class. We have now a Freshman class of one hundred, a Sophomore and a Junior class, thirty-five each, and some thirty who are preparing for college, in branches in which they showed a deficiency last spring.

The courses of study occupy four years. They are largely scientific and industrial, balanced and relieved by such instruction in the German language, and in the English language and literature, as the time of students may warrant, and their tastes demand.

They rest upon the fundamental principles of chemistry, natural history and mathematics, which are strongly taught, and aim to present plainly the practical applications of those sciences to farming, gardening, engineering in its various branches, and to the other arts and professions of life. While principles are taught in the class-room, they are carefully illustrated in the field and the work-shop.

Two departments of study are organized, viz.: the agricultural and the mechanical, as required by the act of Congress making the land grant for the support of these colleges.

In the agricultural department, four courses of special study are arranged—that of agriculture, horticulture, pomology, and stock-breeding.

In the mechanical department, likewise, four courses—that of civil engineering, mechanical engineering, mining engineering, and architecture, respectively.

For the first year and a half, the several courses are identical, consisting of those studies which are preparatory to all alike, viz.: Algebra, geometry, trigonometry and surveying; in mathematics book-keeping, free-hand drawing, rhetoric and English literature human physiology, general chemistry, and something of natural philosophy and botany.

From the middle of Sophomore year the courses divide, students in engineering putting their main strength into mathematics, mechanics and drawing, with practice in the field and work-shop; while stu-

dents of agriculture work more in the laboratory and the museum, making chemistry and natural history, including botany, their principal studies, with work upon the farm and in the garden.

To all alike are taught military tactics, and in their senior year the principles of intellectual and moral philosophy, logic, political economy, and constitutional law.

Throughout the course, the object is, on the one hand, to teach the arts—first in their scientific principle, and secondly in their practice, so as to make both learned and skilled workmen; and, on the other hand, to make good men and useful citizens, able to take their places in society, and perform their duties as such.

The students consist of both sexes. About one-fourth of them are girls and young ladies, who occupy rooms in a wing of the building.

The question has been frequently asked, if, in schools, where the sexes are educated together, young women show a capacity for study equal to that of young men.

From an experience of twenty-five years in conducting such schools, I can say confidently that the two sexes are of an average equality in their capacity for scholarship.

Some of our best students are young ladies.

One of our best manipulators in analytical chemistry is a girl of seventeen. Variation in natural ability is shown in different families, not in sexes. Our young women recite in the same classes with the young men, and retain an average rank there.

Then, further, the presence of both sexes, under the proper system, makes the government less difficult and more wholesome.

Sexual isolation, for the purpose of culture, is contrary to nature; it makes boys rough and girls silly. Of course we have had occasional troubles in government. What college does not? But such troubles are far less, as I verily believe, both in number and seriousness, than occur under the old plan of separating the sexes.

I am unqualifiedly in favor of co-education.

In the college building we have been trying a new experiment in government with entire success. Soon after the college was opened, I said to the students, that the maintenance of order in rooms and halls was mainly their affair. I then proposed to them a plan of self-government, which was adopted and at once carried out. There are several sections in the building, a section being composed of a single hall and its adjacent rooms. The students of each section choose a captain and lieutenant, to take charge of the order and see that the study hours are kept.

A member of a council or court was also selected by each section, and this court meets twice a week, to try all offenses reported by the captains, and, if guilty, to assign certain demerit marks, which are reported to the Faculty.

This simple plan for self-government has been pretty uniformly successful. It has saved the Faculty all the petty annoyances which

arise from the maintenance of police regulations, and its influence on the students themselves is very salutary. I do not think, however, that it could be sustained without the aid of an enlightened public opinion on the part of the students.

We require all students to spend three hours a day in manual labor, and to meet this requirement, we have a farm of 900 acres, 400 under cultivation; a garden of ten acres, an orchard of small and large fruits, of equal area, a work-shop, and a park of 190 acres.

We do not call this work compulsory, though all engage in some departments of it.

The daily labor is no more compulsory than the daily recitations, and the students come to both with equal cheerfulness, and have an equal freedom of choice as to what kind of work they shall do. We are striving to make, as soon as may be, all the work strictly educational. The student of pomology, for example, goes into the orchard and vineyard; the student in stock-breeding has the care of stock. The botanist works in the garden, and the mechanic in the work-shop; and the young ladies, under a competent superintendent, do nearly all the labor of the kitchen, the dining-room and the bakery.

The clerks, librarians, fire-builders, bell-ringer, and the cleaners of the public rooms and halls, are all students, and the whole matter of manual labor, complicated as it is, seems, somehow, to get on with a good degree of regularity. Of course it can not be permanently successful without careful and constant watching, but we have never for a moment thought of abandoning so salutary an element in higher education. I am happy to say that though we are not quite three years old, so far we have realized our hopes, in numbers and in the quality of students, in uniform manual labor, and in the co-education of the sexes.

Mr. Flagg—I want to ask the gentleman in regard to the price paid for labor.

President Welch—The highest is nine cents an hour. If the labor is of that kind requiring skill and instruction—one of the nicer processes of the garden, for instance—we pay seven cents; but what is called the deal work is remunerated at the rate of nine cents an hour.

Mr. Murtfeldt—I believe Dr. Denison has some experience in regard to having both sexes in colleges, and I should be glad to have him say something about it. I will say, while on my feet, that the daughter of Professor —— at the University of Missouri, took off the prize as the best Greek scholar in her class, and she was at least one of the three best in the higher mathematics in a class of thirty.

President Denison—I am pleased to know the question was settled in Iowa before President Welch went there. Previous to that time it was not quite settled in Kansas. The trustees were divided on the question of admitting ladies, and we frankly asked what right they had to exclude them, as the endowment was not given to any particular portion of the citizens. I agree with President Welch in his

statements and convictions in reference to that matter. It is true that it requires care in government; but I believe with him, that government, on the whole, is easier where the sexes are together, than it is where they are in separate schools. The system of education in Kansas is based on the idea that ladies should enjoy equal privileges with gentlemen, not only in the common schools, but in the higher institutions. Our experience in reference to the ability of ladies to compete with the gentlemen accords with the statement made by President Welch; and some of our best scholars have been ladies. We graduated, this year, four ladies and one gentleman, and in 1867, we graduated three ladies and two gentlemen. The ladies are interested in fruit culture, in horticulture—in fact, a portion of our ladies have been through Waring's Elements of Agriculture, in the agriculture class, and attended to it with interest. I believe this is the true course for the West, and I think the East is working into it. I have had inquiries from Amherst College with reference to the subject, and I doubt not these places will admit ladies before long. The single lady that appeared in the Michigan University, and was not excluded, won her way by her character, and obtained not only a standing for herself, but for others, and now there are thirty there.

Mr. Flagg—What is your experience with the labor question?

President Denison—I am sorry to say it is not the experience of President Welch, and I congratulate Iowa on her success in this matter. We are working at it, and accomplishing something. They had a great deal the advantage of us. The State gave them a building costing $130,000, making all its appointments really about $200,000, and placing things in such a shape as to not only invite, but encourage labor. We began at the beginning; we were poor and had to work up; we have now a farm of 415 acres, and are getting things into shape; so I trust our report on the labor question will be more favorable in future than it has been. We have proposed to pay students for their labor.

The Chairman—We should be glad to hear from President Folwell, of Minnesota.

President Folwell—In Minnesota there has never been any legistion on the subject of admitting women to the University. There is no such thing as sex known in the charter, or act of incorporation. They came there in the beginning, and have been there ever since. It has been with us entirely successful. There have been some difficulties, but small ones; they do not begin to compare with those turning up every day in the old colleges, as President Welch has remarked.

The two sexes are mingled as they are in the family; we could make no separation, owing to the structure of the building. Thus far we do not find our male students get the start of the young ladies. I have no doubt of the result of the experiment. The young ladies can take care of themselves up to that point; whether they can hold their own in abstract studies, remains to be seen. I think they will.

The manual labor question has not vexed us yet. It strikes me it can be settled on general principles. Each institution must settle that for itself. In some places it can not be practiced with success, and in some places not at all. President Fairchild, of Oberlin, wrote me that after an experiment of some years, they were obliged to give it up, because the expense of maintaining it was overwhelming. They could not afford to provide the material for the students to labor. Our farm is a mile from the building, and only a few of our students live in the university building. The farm is so far away that students are unwilling to go to it. The Agricultural College was attached to the University, and buildings have been erected in the meantime. It was not practicable to purchase a farm in the immediate vicinity, but we intend to build there one of these days. It seems to me it will be troublesome to provide labor for a large body of students. I do not commit myself on the question whether it ought to be done. Some can do it, and some can not. In principle, it seems to me it is not necessary. I do not know we need a farm any more than we need a model cotton mill or machine shop to carry on the corresponding work in the arts; still it is convenient, and if it is possible, we shall endeavor to conduct experiments in various departments of agriculture. It may not be possible to co-operate thoroughly in all the experiments proposed here. We are rather far North. Corn, for instance, is not a safe crop in Minnesota. If the frost holds off two weeks we shall have an excellent crop this year, but last year it was small. We do not want to do much in winter wheat; it is not a safe crop, and is raised very little. Each one must conduct experiments suited to his latitude and people.

I would remark that in Minnesota we recognize the fact that this grant of land for these schools was not given exclusively for agriculture, but the agricultural and mechanical arts and all industrial professions. Our University is located at what is to be very soon a great manufacturing center. There is water power enough running to waste to supply all the cotton mills in the country, and they are beginning to avail themselves of it. For that reason we shall be obliged to develop our department of mechanical arts somewhat in advance of the agricultural. We have, in Minnesota, 60,000 square miles of as good land as there is out of doors, which needs no manure for years, and there is not that need of scientific farming in Minnesota for crop raising that exists in many other localities.

I will allude to the military matter. When I went there two years ago, I found holding the position of Professor of Military Science a retired officer who had been a Major-General of the volunteers. He remained with us but a year, and then left to go into some business, but during that period he conducted the military matter quite vigorously. He was a popular and successful instructor. Since then nothing has been done, and whether we do anything further will depend upon whether we can get a successful instructor. I can not

give the time to it myself to conduct the exercises, and we have no one else to do it. The practical proposition is this: That we bring the matter forward in a proper way, and ask Congress to legislate that the military exercises shall not be obligatory, except when the Secretary of War shall detail an officer to give the instruction. When this is done, I think we ought to be obliged to give the instruction; otherwise, to do it or not, as we please. I have no doubt the intention of Congress was to make the military exercises obligatory, and I am fully disposed to comply with the letter and spirit of the law. What we ought to do depends on what we can do, and that is what we shall do in Minnesota if we get an officer who will carry it out; if not, we shall wait awhile.

I want to make one remark on the matter of secondary education. I think this is a great want of the country just now, and we are doing in Minnesota what we hope will stimulate the development of the secondary schools. I think we make a mistake in organizing the Agricultural Colleges as academic institutions with a little seasoning of technical studies. I do not believe in inviting our farmers to receive a farmer's education as such. The farmer, if he is to be educated, shall need the same kind of education as others; he wants to be a man as well as a workman.

We, therefore, propose this to the educational men in Minnesota: that they develop the high schools of the State as rapidly as possible to do all the work up to the end of the Sophomore year. President Angell proposed, in his address at Ann Arbor, that the high schools do all the Freshman work very soon. We have proposed that to the high schools of our State. When this is done, the University will be delivered from a great deal of work which belongs to the secondary schools. We propose to start our Agricultural College from this common basis to secondary schools, and make it a technical school of agriculture and the mechanical arts, and not simply higher academic. In the mean time, what we shall do is what we can do. I propose, as a practical thing, to assemble this fall a class of any number who want instruction in agriculture, for the purpose of practicing it. We shall give no degree to a student in that department unless he has a good general education. I should be glad to answer any questions.

President Denison—Let me ask in reference to training in your secondary schools. So far as I see, this can be accomplished in your chief cities and principal towns; but when you get out into the country towns, which need the benefit of the agricultural department, they can not have the benefit of the schools, and unless the institution adapts itself to them, they go unbenefited.

Professor Folwell—That is quite right; we recognize that fact, and are maintaining a preparatory department intended to meet the wants of such schools. Our rule is this: That the university begin almost where the high schools leave off; we intend to work in harmony with them. We have this advantage: that we have a rather

clean sweep in no competing institutions; we propose to leave the secondary work to the public high schools and the denominations. I have long been of the opinion that the division under the land grant was unfair. It was made in 1862, on the basis of the then population. Since then Minnesota has doubled in population, and has acquired one additional Representative, but we have got no more land for the college. It seems to me such a basis of division never could be fair. I have no plan just now to propose, but certainly a better one might be devised. The State of New York has 46,000 square miles of land, and she gets 990,000 acres of land. What does Illinois get? 480,000 acres, and she has 55,000 square miles; Minnesota has 83,000 square miles, and gets 120,000 acres. It seems to me the opposition which might arise in changing this matter can be met. They do not like to have scrip located in the states.

Professor Hilgard—Our scrip was only issued a short time ago, and has just been sold. The scrip has been divided between the white and colored universities. The University of Mississippi, which is to be continued, has been allowed two-fifths of the agricultural fund, while three-fifths is to go to the colored university. I was requested to learn as much as possible by the Board of Trustees, and especially in regard to the labor question, about which we have been a good deal exercised—I think unnecessarily. I think at the present time it would not be at all difficult at the South to get as much labor as would be desirable for the purpose of illustrating the principal portion of the course in which the student may be at the time. There is one difficulty, however, which I perceive is not very much insisted upon by the gentleman who first spoke; that is, that of government. Most of the gentlemen have spoken on the supposition that the students were located in dormitories. We have about come to the conclusion that the dormitory system was impracticable, and intend to abolish the dormitories, or introduce military discipline. It is proposed by our trustees to have the agricultural students remain in the dormitories while the other students are free to go where they please. I would inquire whether any such separation of the two classes has been introduced anywhere else, and especially in the University of Michigan, which has had the largest experience? It seems to me injudicious, but it is likely to prevail, and I should be happy to have any suggestion on the subject. I believe any such distinction between the students would be injudicious and unnecessary, to say the least.

The Chairman—In regard to the questions that have come up, they have all been interesting to us, because we have had the experience that has touched on them. We have recognized the fact that the grant itself is designed not for agriculture alone, but for all scientific education, and especially scientific as applied to all the arts. So we proposed the organization from the outset, not only of an agricultural college, but a mechanical college, and we have now several distinct courses—all of them looking to certain recognized professions

and pursuits in life. We have two courses in the agricultural college —a course of agriculture and a course of horticulture; the agricultural embraces two branches: plant-husbandry and animal-husbandry; and horticulture embracing not only ordinary garden culture, but nursery-work, orchard-work, forest-planting, or the care of green-houses. We have all of these departments, indeed, in successful operation, in a small way. We have a market-garden and a nursery, and a large fruit-plantation—perhaps as large a variety in our apple orchard as will be found in any one orchard in the country. There are about 3,000 trees and about 1,400 varieties in apples. We have several hundred varieties of pears, and a considerable collection of the small and other fruits. We have the trees there in nursery, or already in field, and have a forest plantation to experiment with—some thirty sorts of timber-trees, selected by the best authorities as being promising for timber-groves on the prairies. We have also green-houses, which are now particularly under the care of the young ladies. We have also a course in mechanical engineering, a course in civil engineering, and some who have begun the elementary parts in a course of mining engineering. We have a course in architecture, and two or three students have entered, and we are making provision for a full development of the course. We have a course of applied chemistry besides the analytical course, and we have also a commercial course. The teacher is a gentleman who was for some time a teacher in one of the commercial colleges, but of more liberal culture than many of them, and gives instruction in the branches suitable to fit a man for commercial life. We have in addition to that a military course partly developed. The students in the military course have simply been in some text-books in tactics. I should have said at the outset that we adopted the voluntary plan as to study; that is, we threw the whole field, as far as we could, open, and allowed students to select their own courses and their own studies in the course. We have several recommended courses that we put in the hands of the students, and say to them, if they have no choice of their own they had better take that, and they have largely followed the course advised. They are most of them four-year courses. We do not confer degrees. The members of the Legislature visited us during the last winter, and asked the question whether we wished to have our law of organization modified so as to give us the power to confer degrees? I told them I had no care in the matter; that for a year or two, until our reputation was, perhaps, wider, it might be a little benefit to us; in the long run we hoped to make the certificate we gave of equal value, and did not care to confer honorary degrees. We have a sort of diploma, which states that the student holding it has pursued a partial or full course in the different departments he has chosen, and attained a certain percentage of scholarship in the studies mentioned, and there is enumerated, in his diploma, everything he has studied.

So every boy's diploma will certify as much as he makes it, and no more.

We have dormitories. I wish we had none; but they were given to us, and we use them, of course. We could not use the building very well for anything else. In the management of the students who occupy the building, about 150, we have adopted the same plan that President Welch has adopted. I said to the students, after one year of governing the Institution by the Faculty: "You are young Americans; you expect to govern yourselves, and will be governors of the country bye-and-bye; why not begin now?" We offered them, at their option, the privilege of undertaking their own government in the Institution. They had a meeting, and unanimously voted to undertake the government. We have a semi-military organization, as we have had from the outset. Every corridor has its hall-sergeant, whose business it is to assemble the men, lead them to the chapel, etc. I suggested that they should appoint a council, and a council of five or six men was appointed, with a president, who act as a court, the adjutant of the building being the chief executive officer. The hall-sergeant in each hall reports any offenses to the adjutant, and they are then tried by the court. They have appealed to me but two cases only in the whole time. Shortly after the opening of their government, they said they had caught, in one of the rooms, a number of boys, with some one fiddling, having a dance, and it was against their rules, and asked what they should do in the case. I said to them: "Is it a violation of the rules?" They said, "Yes." "Can you prove the guilt of the parties?" "Yes." Said I, "then there is no option; you must enforce the law." I never heard anything farther about the matter. The other case that came before me was that of a young man who declined to pay his fine. They didn't tell me what his offense was, and I did not ask, but told them he must obey the rules, or leave the school. They have written out their constitution and by-laws, and put them up in the library, and govern matters their own way. I must say it is well governed, and better than I could govern it with the whole faculty.

I want to say, there has been in the State, thus far, a pretty good feeling—much better than I could have anticipated—between this and the other institutions, and I do not think there is very much danger of any rupture of the harmony. I have said, whenever I meet gentlemen of the other institutions, the only difficulty, I suppose, that would occur would be a little feeling of jealousy for fear one institution would get more than its share of patronage. But there is a plenty of material to fill every college of the State. We want more educated men everywhere, and would not have enough if every college in this State was crowded to the utmost; and there is no room for jealousy.

The first two years of the history of the institution we had no young ladies; they were not admitted. We were not provided with

conveniences for them, as we are not very well now. Although the arguments pro and con seem to be so equally balanced that I did not think it was a matter of much consequence either way, my own private conviction had been that while I believed in the entire capacity of young ladies for a college education, I do not recognize any great difference, for I have had young ladies go through calculus and other departments with as much success as others; and as to their need of education, I do not see any difference between the sexes—if anything, I would rather give education to the women than the men; and as to their right to education, nobody can question that. Still, I have always felt disposed to say this: If you are too poor or too mean to give to women equal institutions, then let her be admitted to the best you have; but my own impression was, if the nineteenth century would do what it ought to do, it would endow its women's university with as broad a basis as that provided for young men; but if you can not do it, give woman the best education you have. When it came to a vote, the committee who had it in charge being equally divided, I gave my voice in favor of their admission. I have some daughters of my own I love too well not to wish to give them all the advantages possible. I knew before-hand there were great advantages in the way of government. The influence on each other of the sexes is certainly good. We have several ladies in the chemical laboratory, doing themselves and the studies good justice. Several of them are interested, more or less, in some of the practical studies. I suggested to our gardener that the young ladies go into his green-house, under his supervision; and they are doing, in term time, a large portion of the work. There is not much done in New England by ladies in farming, but I recollect meeting, on one of our excursions, a New England school-teacher who had come here and bought ten acres of land, and I found her out with big mittens on, with her hired man, at work raising fruit and garden vegetables, and making money. She had not had the benefit even of an agricultural education, but was working out her destiny because she had worn out her health in the school-rooms of the East.

The question of labor, our friends all agree, is a difficult one. One might come in here and ask us the question, "Why are you troubled thus about it? Why don't you give it up if it costs so much trouble?" At the outset I gave you our history. We undertook the labor-system; I believed in it. We went on to the ground, and helped the boys with a great deal of work. We graded our grounds, laid out walks, planted trees, built fences, put down walks, and did a hundred things, and are still doing many things; but we found it was impracticable to furnish labor for the great number of students that were coming to us. We paid them for their labor; twelve and a half cents was the maximum, and from that to nothing, according to their skill. We finally abolished the compulsory system, and at the opening of the term, after organization, we said to them: "All who wish can join the labor-classes, and we emphasize the matter a little of

joining the classes, and throw the influence, as far as we can, in favor of labor; please to hand in your names to the proper officer, with the work which you have been accustomed to do, or which you wish to do, and the hours of the day at which you will be at liberty." Then we organize three labor classes to labor two hours each—one from ten to twelve, another from one to three, and another from two to four. We leave the house between four and five for general lectures, drilling and other exercises. Then we take the labor-class of the morning, and distribute them to the garden, to the ornamental grounds, to the shops—to wherever we may have labor for them; and we do so with the afternoon classes. They report to the superintendent in charge, and are expected, at the proper hours, to appear on the grounds. In the mechanical shops we work under the same system, except in some parts of the work we allow piece-work—that is, giving them a piece of work to do, and the Professor says: "That is worth so much," allowing them to take their own time about it. In the mechanical course, I would say, inasmuch as it requires a great deal of instruction at the outset from skilled men, they are required for three terms of their course, to take shop practice, just as a student in chemistry takes laboratory practice, for which he gets no compensation.

Why should we keep up this? To my mind, these are the real reasons: In the first place, the labor system with us has an advantage in allowing poor young men to help pay their way. A great many young men come to us absolutely penniless, and actually pay all their expenses during the whole course. It may be true that we have more of that class of students out West, and yet Prof. Felton told me—I think it was he—that the glory of Harvard was in educating so many poor young men; but there they have scholarships, and many advantages in doing this. We can not afford to carry it on simply for that alone, although we ought to tax our patience urgently and funds a little, to help young men get an education. We do not expect, of course, that a man who has spent four years in scientific study will go out as a day laborer on the farm. They will work with their brains, but after all it is necessary they should know practically, and they never can do it except by labor. We find this: that a practical application in any of the exercises, as well as in any of the arts, gives a practical and correct judgment of the value of the facts in that science. To illustrate what I mean: To the student, the principles and the facts of the science and the facts in the books are on a dead level and it takes as many lines of the book to describe a fact, as it does a controlling principle; the teacher may distinguish the difference, but the pupil does not. When he sees the practical application of it, he knows it at once. There we have another objection. In the study of natural history and the sciences of observation and experiment, we make a mistake in setting them to learn that from books. When he tudies natural history, he studies what can not be put into a book,

but is outside of it. I recollect with what eagerness, when I had been poring over Latin or Greek for so long, I commenced the study of geology and botany, and the interest with which I went about it; but this zeal evaporated in nine out of ten before we had been three weeks in the class, simply because we were studying not botany, but descriptions of botany; and in these schools you will be obliged to show these applications, not simply with the eyes, but with the hand, and failure will result unless they receive that training that comes alone from the practical adaptation of means to ends. If I take a theorem in a book, and my pupils learn it, I am never quite certain that their judgement has been precisely correct; but when a man makes a judgment in regard to the direction of forests, to split a stick of wood, for instance, the next blow tells him whether his judgment was right. The men who are leaders or forces in this country—I do not care in what department—are, in nine case out of ten, men who, some time in their life, probably before they went to college, knew how to work and were trained to work. I am solicitous, for one, as I suppose you are, that our industrial universities shall send out characteristic men without titles or degrees, but with education, to take their place in the ranks. I have an idea what I want them to be—not mere fluent talkers. I would like to have them speak respectably if they have anything to say, and know enough to keep still when they have not—not merely men who can chatter about science, but, with intelligent and practical minds, can do whatever they are required to do, wherever it is—intelligent, able, working men, who do not feel above labor, but regard it as one of the incidents of life, and one of the necessary results. A great many of the students do not work, but there is no man among them who does not honor work, and no one hesitates to put on his old clothes and march out with his spade or hoe and work. They know all of us honor labor as the means by which the vast millions of the family of man must be sustained with daily bread.

I think I have touched all the points called out by the speech of my friend, with this exception: there has been the most enthusiasm in the institution, in the studies, of any school I ever knew, and there have been the fewest laggards, with the least disposition to shirk work. They said to me: "If you make the studies all free, you will have the boys come in and take the things that are easy, and leave the things that are hard." They take the things that their good common sense tells them are the things that will be the best for their future power in the world. They will take that thing which tends most directly to the end. There is no danger in throwing up the whole field of labor, and saying to young men: "Take what you want, what you have time for, what you need." The result has been a very rapid growth of the institution. I ought to say, perhaps, here, we have not felt ourselves compelled to follow New England, much as we honor her, but we have felt ourselves at entire liberty to build

up an institution for Illinois. We have not asked ourselves the question, what they require for admission, but what the young men are prepared to do, and what they will do, and what we can do for them. They may not travel over a four yours' course, and they may not begin as I did, or end as I did; but the education will not be determined by the point they stop at, but the distance they can climb afterward. If you will give us time, I think we will successfully compete in the ultimate standing our young men will take; at least, I have no fear of them, and am ready to take the young men as the schools of the State will furnish them to us.

In regard to the military education, I do not know what was the intention of the law-makers. We are taught not to go behind the statutes, but take them as they are. The law says we must not omit military tactics. We organized, and were fortunate in having for our teacher, Prof. Snyder, who was here to-day, but has now gone—a gentleman who was in the Polish army, afterward in the Austrian army, at the great battle of Solferino, and afterward in the service of this government. He organized a university battalion of four companies, and successfully drilled them. We took this ground, and I am glad to take the occasion to say we have held on patiently, hoping for something. I know that the military drill, after the novelty has worn off, becomes a little tiresome, and it requires effort, enthusiasm and ability on the part of the instructor to keep it up; but it can be kept up. All our students drill. These companies are under the immediate command of the students, who take military tactics as a study. We shall open, on the 13th of September, a drill hall 60 feet by 120, with a large platform, giving space for 300 spectators, and also a lower story, devoted to large machine shops. I am delighted with the success we have met with in the teaching of mechanical engineering in a practical way. I inquired of the schools I saw abroad as to that point, and found they had tried shops, and in most cases abandoned them, but the difficulty they had was this: their students never expect to be laborers like ours; they simply expect to be mechanical engineers, and have charge, in the way of superintendence, of large manufacturing interests, maybe. But this matter of labor is of great consequence. I said to our Professor, "We have $2,000 to buy books and apparatus to illustrate mechanics." He said to me: "Let me make the apparatus we want." I said, "Very well; if you think you can make it as quick as you can buy it, do so." There were several applicants for the course of mechanical engineering. He went into a vacant shop that he got, bought some tools, and made patterns of a steam engine. He wanted one of peculiar construction for illustration. When he got it at work, he wrote to Mr. Corliss, the proprietor of the well known Corliss engine, for the privilege of making the valve gear of the Corliss pattern. Permission was given, and he sat down to make his drawings of the valve gear adapted in size to his own engine. He invented a better one

and obtained a patent on it—better than the Corliss invention, because it does better work and is cheaper; the whole engine can be made as cheap as the Corliss cut off. They made our apparatus of various kinds, put steam heating into the building, and various other things. They are making castings for a 20-horse power engine, that they say shall run so smooth that standing with your back to it, you can not tell whether it is running or not. The beauty of it is, that it has inspired such intense zeal, that every old book of mechanics in the library has been rummaged, and we have been obliged to send abroad for books. They have taken out patents, and one of the students has rented a shop, and is making a patent wind-mill. I am delighted with the result of this shop practice.

Mr. Roberts—Mr. Chairman, I have been quite interested in your description of the working of your institution, and I wish to say that we have succeeded in nearly the same way. I have been connected with the institution only about a year, but have had much to do with the students on the farm, running a large farm almost exclusively by their aid. Last year we tile-drained considerable, and much of that has been done by the fathers of these students, when they have returned home and explained its benefits. The result abroad, also, has been similar with regard to deep plowing. And I claim that these are the influences, to a very great extent, that are to go out from these colleges. We are not only to continue to send them out, but they are to be teachers, and they are doing it, to my knowledge. I have received quite a number of applications from the boys for some of the wheat which they helped to raise. In these, and many other ways, they will scatter the information they have received at our colleges, and in that way help to inspire a proper appreciation of our efforts.

Prof. Folwell—We find difficulty in furnishing work. I should like to know what kind of trade or manufacturing business I could start to employ the young men. If I had an employment for 100 young men, at which they could earn their living, it would be of great service to those whose means are limited. The practical question is, what we shall do?

Mr. Roberts—In my experience during the last year, our boys have constructed fence. I let it to them by the job. We make all our fences in that way. Our students milk forty-odd cows, and they take care of the cows; and, in addition to that, take care of quite a number of head of blooded stock, in connection with their lectures on stock-breeding. You can tell the student the difference between the harsh and soft feeling of an animal, but he can not understand it without the examples before him. We plant all our corn by the help of students. I can get more out of a squad of forty students for two hours and a half, than hired men. In some kinds of work there is a profit; others result in loss. Certain kinds of work can be done—cutting corn for instance. We cut corn two cents a shock cheaper than we could by outside help. We shall have this year some 5,000 or

6,000 bushels of corn, in all probability. Our churning is done by the students; in fact, we use them in almost every place. As I came away, almost the last thing was, to give some directions about hauling wood for the bakery, and the students cut the wood at so much a cord. Sometimes the students want to work half a day. They come in the morning, and are ready to start at seven o'clock; instead of having a dread of work, they are anxious to do extra jobs. Most of them are limited somewhat in their means, and when at the first of the month they are able to reduce their expenses for the past month, by six, eight or ten dollars earned, it aids them very much.

Dr. Miles—I think that in the practical departments, labor can not well be dispensed with. Students who are at work on the farm take a greater interest in the study of agriculture. There are many topics it is difficult to teach in a satisfactory manner, without actual illustration before you. Take, for instance, some processes in the laying of the drain, putting it down in quicksand, etc. You may lecture by the hour, and still the student does not appreciate the importance of the directions given. Put him in the ditch, and he sees at once how it is, and he takes a greater interest in the lectures. So in regard to stock. We look upon our farm stock as the means of illustration, as much as anything in the apparatus. Lectures on the different breeds of stock can not be appreciated, unless he has the animals before him. There are certain peculiarities you can not well describe, but you can point them out. Our students do not object to any kind of labor. We do not set the students at work that they understand, but at work that they do not understand. We do not, in this labor, have reference to the gaining of manual dexterity merely, but we want the student to continue at the particular kind of work, until he understands the manner in which it should be done. This season we have put up a large building; the students laid the foundation, cut the timber, took it to the saw-mill, and put it up, and they feel proud of it. Although we may never work at the carpenter's trade, yet when we have buildings to put up, we shall know whether they are properly constructed.

The Chairman—The question that President Folwell suggests is a practical one—what to provide. I can see the time will come when all the fences will be put up that we want—all the buildings required will be finished, and when, for instance, all our under-draining, which we have used largely, will be done—when there will be no work of that kind. The question, I think, ultimately will come down to this: We will be obliged to resort to work—whatever we have on the grounds available for the students in that department. That is, the agricultural students will have whatever work we have on the farm, the horticultural students work in the garden, and the mechanical students the work of the shops. I think all of us will be obliged to relinquish the labor system, except the ordinary work. In Kentucky they have a large manufactory of wagons connected with their insti-

tution. The trouble is, the mechanics of the State will find just the same fault with your attempting manufacturing, that they do now with reference to its being done at the Penitentiary. It is going to be very difficult ultimately to manage the work.

Dr. Miles—Before adjourning, the committee on programme would make their report for the order of the day to-morrow, as follows: At 9 A. M., "Experiments on the Pennsylvania Experimental Farm." Discussion to be opened by Professor Hamilton, of the Pennsylvania Agricultural College. At 2 P. M., a paper by C. W. Murtfeldt, on the "Agricultural Colleges of Europe and the United States."

At the suggestion of Mr. Murtfeldt, the reading of his paper was changed to 9 A. M., instead of 2 P. M.

The Convention then adjourned till to-morrow, at 9 A. M.

FRIDAY, AUGUST 25, 1871.

The Convention met pursuant to adjournment, at 9 o'clock A. M., President Gregory in the chair.

The President read the following communication from M. C. Fernald, acting President of the Maine State College:

GENTLEMEN: I regret very much that our College can not be represented in the Convention to be held at Chicago, commencing the 24th inst. Its object I recognise as of signal importance. I had hoped to be present, but find I shall not be able. Shall learn of its proceedings with interest. Most truly yours, M. C. FERNALD,

Acting President Maine State College.

The Secretary stated that the first thing in order, according to the order of business, would be the reading of a paper by Mr. Murtfeldt, on the "Relationship between the Agricultural Colleges of Europe and those of America."

The President—While we are waiting for the gentleman to arrive, I would say to the Convention that we have, in addition to the invitation to visit Riverside, which I laid before the Convention yesterday afternoon, an invitation which has been brought in this morning by the Commissioners of the Land Department of the Illinois Central Railroad, for the members of the Convention, or as many as may find it convenient, to take a trip along their road. They offer to put at the service of the Convention one or more sleeping cars, or a special train, if it is necessary, to take us down any distance, and on any part of

their road, stopping where we please, and connecting with such trains as we may please.

We all know that the Illinois Central Railroad Company, in addition to being a railroad incorporation, has had a very large share in the work of increasing the agricultural population of the State. They hold a large amount of the farming lands of the State. They have, through their labors, succeeded in settling a large portion of the State, and they have still some hundreds of thousands of acres of the best land in the State in their care, and are interested very greatly in the agricultural prosperity of the State. There are a great many points of interest along the road. Champaign, and the State Fair at DuQuoin, could be taken in on the route. We, who are from the former place, would be very glad indeed if the gentlemen of the Convention would accept this invitation and stop over and see us.

The consideration of the invitation was postponed, to permit Mr. Murtfeldt to read his paper.

Mr. Murtfeldt—I will say that a good many of the points that I have endeavored to bring out have already been traversed in the discussions of this Convention: the labor question, and several others. I did not know exactly what form this Convention was to take. I knew that part of the object of the Convention was to concert action with regard to experiments to be tried. I had hoped that I should be seconded—if we are going to allow any division between the scientific and the practical men in this connection—I had hoped that I should be seconded by such men as Mr. Flagg and others. Mr. Flagg, I believe, is a college graduate. I want to impress upon this Convention this idea in regard to these industrial classes, and the money given to them by the United States, and which is held in trust for them. And that is the point that I want to bring out especially. It is the money that is given by Uncle Sam to industrial classes, and the attempt to divert this money in favor of the so called "classical" institutions, solely to bring them up to that standard—if it is up, which I do not exactly agree to—to bring them up to that standard that they will watch you very jealously; and, when attacked that way, will call pretty loudly, from the press first, and then from the farmers themselves.

I have been very much pleased with the spirit that has been exhibited by the gentlemen here, and if I could have intruded myself upon the Convention after the very pleasant, agreeable and sensible talk that we had last night, I should have called attention to this fact then.

In the New England States, according to Prof. Gilman, the most of the benefits and emoluments received from the land grant are already diverted. He says "we draw upon the farmers for our students, but we do not return many to them. We have two agricultural professors in our institutions, and half as many students."

I simply want to call the attention of this Convention to the fact that the farmers are jealously watching these grants, every single one of them.

And perhaps there has never been, in one sense, a more important Convention called in the United States, than this very one. A great deal depends upon the experiments that are being tried at the experimental stations—for in the end our agricultural colleges will amount to nothing but that they will be experimental stations.

Mr. Flagg—I wish simply to refer to the gentleman's allusion to me. I heard my name mentioned, but I did not hear what was said. I do not know but that he misrepresented me. I am very anxious to have my record clear.

Mr. Murtfeldt—I will inform the gentleman that I want him to take the stand at the unscientific side of this Convention, or I will find myself alone. He, being a graduate, went over to the college side of the question.

Mr. Flagg—I want to be, and I think I am, a more practical man than Mr. Murtfeldt. I think I always have been. While he has been theorizing here with regard to the encroachments of the classical, or college-bred men, if you please, upon the domain of practical life, as they claim, we, who are but representatives of a great many other men who have the same opportunities, have been working, I think, perhaps fully as much as he has, and I believe a little more, to the practical ends of agricultural education.

Now the statement that was made here last night, I believe, by Prof. Gilman, (if he did not make it here, he made it elsewhere,) in regard to the small number of agricultural students who are graduating from Sheffield Scientific School, is in itself no proof of failure. I think Mr. Murtfeldt himself will admit—if he will not, certainly a large portion of the men in this room will—that Prof. Johnson, in his "How Crops Grow," and "How Crops Feed," is doing more to advance agricultural interests than any other man in the United States.

That is my solemn belief, and I don't care in what way this work is done; whether it is done by taking students into the school and sending them out as graduates, or whether it is done in the way in which Prof. Johnson has done it; so the work is accomplished, I think we ought to be fully satisfied. I think there has been nothing more practical or more valuable for getting our general agricultural practice upon a scientific basis, than those works by Prof. Johnson. I think this country owes a great debt to Sheffield Scientific School, and I think Mr. Murtfeldt himself will take that view of it. But I don't think it is right to attack Yale College or any other institution that is doing as much in a different way toward agricultural science, with the plea that it is impracticable.

Mr. Murtfeldt—I did not mean to be so understood, sir. I simply quoted Prof. Gilman.

Mr. Flagg—I am a Yale man, and I belong to Young Yale, too. I believe that Yale is all right, and so is Harvard. I believe although those are classical schools, so-called, that they are doing their work, and doing it well for the practical men in this country.

Mr. Denison—The law of Congress places the matter in this form: These institutions are endowed to teach (not excluding other scientific and other classical learning) such branches of learning as relate to the agricultural and mechanical arts, in order to promote a liberal, practical education in the industry of life. I suppose that Mr. Murtfeldt will not exclude the classics?

Mr. Murtfeldt—Certainly not, sir.

Mr. Welch—I am a little in the fog in regard to the exact distinction drawn between the scientific and the practical. I think I have never been able to see it. I think that the usual distinction (which I do not believe is well founded) is about thus: There are a class of men who have no knowledge of abstract science, who have become by long experience, skillful in the manipulations of the farm—and they call these men practical—and they have knowledge, no doubt, of an exceedingly important part of farming. Then there are men, on the other hand, who work in the laboratory, who are skillful botanists, and who have accumulated by life-long industry great knowledge in these departments. Now, I hold that those men who determine the principles that can be applied on the farm, and that indeed form the basis of all genuine progress on the farm, are just as practical as the other class. [Applause.] So I have long doubted the wisdom of giving to one class, viz: the workers—I mean muscular workers—all the credit of being the only practical men; and, on the other hand, I have doubted the justice of giving the intensely earnest workers in the laboratory and in science, the credit or the discredit of being the only theoretical men. Of course, the so-called practical men—the muscular workers—can not do without the scientific workers, because there would not be any great or genuine progress without the application of scientific discovery to the work on the farm, in the garden, or in the work-shop. Indeed, there could not be any real progress without these scientific, practical men. And, on the other hand, the scientific, practical men never could reduce their experiments, their discoveries, to practice on the farm without the muscular workers. So I believe that all these men are practical men, all of them.

I heard yesterday a sentiment that I (and I speak with all deference to the speaker) did not like. I have forgotten who the speaker was, but the sentiment was in derogation or deprecation of the idea that a school should have a sprinkling of agriculture.

If I may not be too egotistical in reference to our own laboratory, I would say that we have there a two and a half years' course in analytical chemistry—in experimental chemistry, at any rate. Well, I might call that a "sprinkling of agriculture," and a pretty large

sprinkling, too. It is true that the analyses do not always point right to the farm, but they always have a bearing upon it, and the truths of science are intimately connected together. You can not teach a boy one experiment in the laboratory, or any manipulation of the laboratory, that is not related, more or less directly, to the work on the farm.

Now, if I should stand at the head of an institution of learning wherein the whole scope of the work was simply out-door experiments, or wherein art was taught simply—the manipulations of the farm and the nicer processes of the garden, with science left out and the laboratory left out—I should resign in utter disgust; I could not run such an institution. Nor do I believe that those institutions can ever be successful, or that they can ever be practical in the widest sense of the term, unless they are founded upon genuine attainments in science. And then the practice, as it is called, or the art, which is better, comes in; and no man can be a genuine *artist* in agriculture, or in the garden, or in pomology, or anything else, unless his labors are founded upon large attainments in science. [Applause.]

Mr. Hilgard—There is one point made by Mr. Murtfeldt, which I desire to notice. and it is this: He says that after all, the main object, or what is meant, is experiments and experiment stations. This would seem to imply that we really have no genuine progress in agriculture, or rather that we have nothing to teach that would benefit the farmer. I do not think that agricultural science deserves that imputation; nor do I think that experiments are at present our primary object. It is the popular prejudice that they are to be so. I do not think we ought to encourage this popular prejudice. I think that while experiments properly carried out are of great importance, yet at the same time we must teach the principles, and, with the priciples, sufficient practice—that is, sufficient practical instruction to teach the application of those principles. How the work ought to be done is the main object of these colleges. After all, our experiments can only lead to general results, and only by experiments continued for a number of years, and by a large number of colleges, can be secured the recognition of general laws. Now if we announce that it is by this slow process alone that we can benefit the agricultural community, I think we lay a trap for ourselves. I think we should stand just on the ground that we have a great many things in practical agriculture to teach which are exceedingly valuable; that it is more practice, more handicraft, that we wish to teach, and that we have very valuable principles which we wish to inculcate, and that without experiments our colleges are not worth anything. We are to place ourselves, then, on that ground, and let experiments be considered as a very important point.

Mr. Folwell—The main point is that this benefaction of the general government is for the benefit of the industrial classes. No matter about whether our institutions are scientific. The main point is the

benefit of the industrial classes—for the liberal and practical education of the industrial classes.

I think I know something about what the wants of the industrial classes are, for I belong to that class. I labored on a farm for the first twenty years of my life, and I think I know just exactly what the wants of that class are. We farmers would not be content with an education inferior to that of other men. That led me to say here last night that the farmer wants an education to make a man of him, not merely to make a working man of him. It is therefore that I made the remark that Mr. Welch has so kindly alluded to, (for it was I who made the remark.) The gentleman misunderstood me. I had not the idea to which he refers in my mind at the time. I ought to have said then, that in the University of Minnesota our plan is to make our agricultural college a college or university which shall be a technical school of agriculture. We do not intend to build large houses in which we shall teach academic branches, because we are already teaching them in our institutions there. We organized as a university long before we got our agricultural college. We got our academic work organized, and we did not need to take up time in the agricultural school to teach the boys algebra, geometry, or even the elements of chemistry, and so on. That is a point in which we make a saving. We intend to bring this system up to the beginning of the Sophomore year, and not to the beginning of the Freshman year, as the newspapers have me down as saying yesterday.

Mr. Miles—I do not wish to travel over the ground I went over yesterday, but I can not pass this subject without saying a word or two in regard to the differences between science and art. It seems to me, that as soon as we confound these two terms, we throw aside all opportunity for improvement. The great drawback in agriculture has been, that we have been claiming for the last twenty-five years that it is practically based upon science. Now, if any gentleman will point out to me a single move or principle in agriculture that is founded on or is derived from scientific experience, I will own that I am mistaken. I do not know of one. Agriculture is an art. It is had with practice. Now the rules governing that practice are derived from experience. What scientific men have attempted to do is to explain why these rules were successful. Attempts have been made heretofore to explain these rules. Scientific men have said the explanation is so and so, and hence they infer that we should modify our practice so and so. The practical men who are thus sneered at found that this was not true. The scientific men have re-examined the case, and found out that they were mistaken.

Now, I claim that if we place science first, and practice afterward, we can not make progress. The art must always precede the science. You can not build up your science until the art has made certain progress.

Why is it that the sister industrial arts are making progress, then? Simply because in the investigation of them the various experiments could be tried. A calico printer wants to know how he can fix a certain color in the cloth. He goes to the chemist with a certain question; the chemist answers that question, and thus he has been directly benefited by the investigations of the chemist. But when the farmer comes to the chemist to ask a question, it is a vague, indefinite, uncertain question that he asks, and the scientific man can not answer.

Now, these two leading objects, or these two lines of inquiry, are of equal importance. I do not underrate or undervalue the importance of scientific instruction. There is no man who gives it a higher place than myself.

And I claim further that an experimenter, in the practical department, can not succeed unless he has a thorough scientific knowledge as a basis of his action.

In this matter of experiments, we have been groping in the dark to a great extent. I apprehend that a large proportion of the experiments that have been inaugurated have been attempted under mistaken notions—the idea that there is nothing known about farming at the present time, that the accumulated experience of the past has been of no use to the practical men of to-day.

Now, I am well satisfied that the principles of the practice of the art of agriculture are well settled, and they have been settled entirely from observation and experience. Look at the history of agriculture in colleges. You find that two hundred years ago certain rules of practice were arrived at by trial and observation; they were reached *materia*. These were printed, but they were not widely disseminated. Very few saw them. You come down a little later, and you find men who had never seen the writings of their predecessors, who have, by the same process, arrived at the same conclusion. We find them to-day, arriving at the same conclusion. We have presented at the present time, as original, (as they no doubt are with the persons who present them,) discoveries that they have originated of great practical importance, which have been discovered before repeatedly, time and again.

What is the object of experiments, then, if these principles of agriculture are well understood? It is simply to give us a little more practical knowledge. The farmer knows very well, and you can not impress it any more strongly upon him by any scientific exposition of the matter, that the best mode of disposing of his corn is to feed it upon the farm, and return the manure upon the farm; that it is for his interest to feed his corn to his stock and get the return in money.

Now, the question would come up in regard to the exact amount of money that he would make for a certain amount of corn. These experiments that we are inaugurating here, that we are attempting to carry on, are, or should be, made for the sole purpose of giving him a

little more exact knowledge in the art. If these experiments are carried on with the understanding that you are going to revolutionize the art, they are carried on upon a strong basis. You can not revolutionize his principles, for they are well fixed.

Now, these rules of practice have something to do with the art of agriculture, and a man can learn those principles—those principles can be taught. The making of these rules should be a question of ways and means. It is equally important that the man of science should interrogate nature, and ascertain the changes which are taking place in the economy of nature.

We would like to have him explain these processes—these rules of art. We know that the one man can not accomplish very much in both directions. It is only by this division of labor that the whole work can be accomplished. The scientific man, in explaining the rules of practice, suggests a new line of inquiry, and then we have to go to experimenting to modify our rules of practice.

Now, it seems to me that this confusion of terms—using the term science to mean practice, and practice to mean science—mixing them all up, only retards our progress. Let the farmer perfect, by means of experiments, the rules of his art, so that he has some good *data*, and then he can put a more pertinent question to the scientific men for the purpose of getting an explanation of the why and wherefore he proceeds. It seems that this distinction is a broad one; it is a distinction that we must make, if we would have progress in the art we are seeking to cultivate.

Mr. Welch—I appreciate the truth of those remarks in general, sir; but agriculture is a very complex term. It covers a large field of operations; and while the gentleman's remarks are true in some of its branches, it seems to me that their truth may be questioned as to others.

For instance, as to stock-breeding. Now, all knowledge of stock-breeding, as studied by the student, is, or ought to be, founded upon progress in physiology and anatomy; and a knowledge of zoology is very important as a foundation for progress in stock-breeding. It is true, the art was in advance of science, and that the science has been established by the constant observation of different experimenters in stock-breeding; but when a fact is fairly set down and agreed upon by the various experimenters, it becomes a fact in science.

There is now, therefore, a science which has to be studied carefully by those who intend, or want, to be scholars in stock-breeding. Antecedent instruction is necessary to practice in stock-breeding; and it seems to me that the progress in the subject has been largely owing to the gentleman's well-known progress in the science of zoology.

Now, there is another branch in farming. It is well known that the farmer has now many enemies to encounter. One of these is the

innumerable hosts of destructive insects that help themselves to his products; and it is utterly impossible that he should intelligibly engage in the extermination of these enemies, unless he knows their habits; and the only way under Heaven by which he can know their habits, is by a full and perfect understanding of the science that gives those habits. And the gentleman has been engaged in the study of that science for a great many years. But I verily believe, after having inquired particularly into his whole practice, that he has given exceedingly valuable instruction before he gave any sort of practice in it. I venture that he will recommend to all of us to give instruction to our students in the principles of zoology, and in the principles of physiology even, before we proceed to instructing them in the science or the art of stock-breeding, and stock-managing, and so on, and so on.

No doubt agriculture is an art that is largely based upon experiment; and that a progress in the sciences upon which it is based actually has been made subsequent to a large progress in the art; and I am sure the gentleman won't assert that every operation on the farm is actually based upon the principles, whether known or not, which, if understood fairly, would belong to science. And I am sure he will say, also, that any scientific knowledge of these principles, whether we have that now or not, would be vastly important to the progress of the science.

Mr. Miles—I will go as far as any gentleman in my admiration of science, and its uses. A man is a better observer who is a thorough scientific man. But the idea that I am proceeding against is this: that our art is based upon science—that the rules of our art are based upon science; and that we call the art the science of agriculture. Now take the illustration of stock-breeding; it is a very good one. If I were going to teach a class stock-breeding, I would like to have them understand physiology and zoology, and all of those other natural sciences, because I could bring illustrations to fix the principles that I inculcated; and they would be illustrations that they would appreciate. That is all true. A knowledge of science in the student is desirable.

But the question arises: Have we made any progress in stock-breeding through scientific investigation? I say no; not one step. Go back two or three hundred years, and take those old writers, and you will find just as pertinent rules laid down for the breeding of stock as you will find in any modern writer. What the scientific man has done, or is attempting to do, is to explain these rules of breeding. Take the first work on agriculture published in Germany, and you will find the rules for breeding, for the selection of the male, for the selection of the female, and the relations of the one to the other, and so on. Come down to later times, and take the writings of John Mill, and the writings of some of the old English farmers, and they get at this matter of experiment, as a matter of observation,

that certain forms and colors were adapted to coupling with certain other forms and colors.

The scientific man has settled very many things; there are many points in which he has succeeded. It is true, that in zoology and in physiology we have a great many illustrations which we can not expect to understand when teaching the principles of stock-breeding.

Mr. Detmers—Since when has breeding made progress? Not before anatomy, physiology, and those sciences were cultivated as sciences. It is but a few hundred years—and I say very much when I say two hundred years—that what we may call breeding has really made progress; that better breeds have been developed. I will not claim that those celebrated breeders in England, for instance, have been graduates of colleges. They have not; but they have been true observers of nature; they have listened to the workings of nature, and found out the rules by which nature governs, and they have applied those rules; they studied physiology from nature. It makes but little difference in the end, whether we study directly from nature, by our own observation, or whether it is taught us in colleges or schools. We have breeders in our own land—breeders who excel, who are not graduates of colleges, but are true observers of nature; others who have money enough, and who commence stock-breeding, and think all that is necessary is money and experimenting; and as experimenters only will they succeed; but those men who follow certain rules, which have been gathered from observation of nature, are the only ones who can, and who will succeed.

Prof. Daniels—A science is only classified knowledge; and when we speak of science, or speak of applying these rules of science, we are simply applying those rules by which a certain kind of knowledge—by which accumulated knowledge, or that kind of knowledge by which we accumulate a sufficient number of facts to state that a certain theory is true—is obtained; and we call that a law—that is, scientific law. Now, it is immaterial whether science comes first, or practice comes first. That is true, and I know it is true of Dr. Miles. He does not teach his zoology, he does not teach his stock-breeding, until he teaches physiology, when he teaches stock-breeding, and applies the laws of physiology to it. I know that he does not teach practical agriculture—that is, the higher and better course—until the student has had botany and chemistry, and he applies those principles right along—he claims that they are practical agriculture, as he teaches them—but he applies those principles right along that the student has been learning for two years before. It is practical agriculture when he teaches it; that is, when he shows them how those particular laws they have learned apply. If the students know it, it is science; and he nor any other man, who has had any experience in this matter, would attempt to teach agriculture arbitrarily; but he would teach those facts as far as he knew them, and show how far science explains them, and that is science, just so far as it goes.

Everything can not be explained by those laws, but just so far as we can explain them it is science. But I know that whatever Dr. Miles says, he teaches those facts as scientific facts.

Mr. Flagg—I don't know as it is worth while to differ much on this matter; it is merely to look on different sides of the same shield. But practically, there is certainly a good deal of force in what Dr. Miles said. We have a great deal of farming based upon experiments, which is good farming as far as our practical life goes; and yet, when you come to explain these processes, and give a theory for them, you will find the men will differ immensely in their theories, and perhaps none of those theories will be right. For instance, in the little matter we were talking about this morning: that is, in regard to our wheat soils. Our experience in Southern Illinois, and that of Dr. Miles in Michigan, and I presume it is getting to be very nearly the general rule, is that it is highly important to compact soils after plowing for wheat; and yet, when you come to explain why that is to be done—what the advantage is that makes the wheat come better, and grow better, and remain through the winter better—you will find that there is an immense difference of opinion. And that is only an illustration of a very large class of facts of husbandry that have not yet been explained, or settled on any scientific principles, so that there is any general agreement upon them; and so long as that class of facts exist, I suppose we must draw a kind of line between practical agriculture and scientific agriculture. I do not think that it necessitates any quarrel at all; it is simply because we know the facts, and can not explain them.

The President—I will interrupt for a moment, to say that I hold in my hand a letter, which is a duplicate of what was sent me yesterday, but unfortunately I mislaid it. I interrupt the discussion a moment to communicate the letter, as it will need, perhaps, an earlier answer than it would receive if I did not read it now. It is a communication sent by the Secretary of the Riverside Improvement Company, addressed to George S. Bowen, and is as follows:

"Will you please extend to the gentlemen now visiting at Chicago, representing the agricultural interests of the several States, an invitation to visit Riverside at any time they may elect. Inclosed please find the time-table of the Riverside trains. By leaving at three o'clock, it will afford them sufficient time to take an extended drive around our improvements, and return on the 5:50 train. I will perfect arrangements there for their convenience, if you will give me a short notice of their acceptance."

I will repeat, also, in connection with this, an invitation that was brought in personally, by one of the officers of the Illinois Central Railroad Company, and this morning tendered to the Convention.

Mr. Flagg—I move that we suspend the discussion, in order to take up these invitations. I suppose the question ought to be settled this forenoon.

The motion was adopted.

Mr. Gilman—I move that the Convention accept the invitation to visit Riverside.

The motion was adopted.

Mr. Hilgard presented the report of the Committee on Permanent Organization.

The report was read by the Secretary, as follows:

Your Committee on Permanent Organization, after a consideration of the general subject committed to them, respectfully submit that in their opinion such an organization would at the present time be premature.

(1). They, therefore, recommend that this meeting adjourn subject to the call of an Executive Committee, to be composed of the officers.

(2). That the same committee be charged with the duty of drafting such articles of association as may, in their judgment, seem best adapted to secure the objects in view.

(3). That, in order that said committee may the better appreciate the demands of the case, a time be given them at this meeting for a general discussion upon the character of the association to be formed—its constitution, its membership, its objects, etc.

Mr. Flagg—I should like to have the report amended so as to read that the committee recommend that when we adjourn, we adjourn subject to the call of the officers; otherwise, the adoption of the report might be construed to adjourn the meeting.

The amendment was made by the Secretary, there being no objection.

Mr. Flagg—I would state that the important matter in this report is the consideration of the kind of organization which ought to be effected; and I should hope that the hour which is to be devoted to the discussion will be taken now while we have the report before us.

The President—The report is before us, and may be made the subject of discussion. The discussion, however, should properly come upon a motion to adopt or to amend, or to do something with the report.

The report was made the special order for 11 o'clock.

The invitation from the Illinois Central Railroad Company was taken up.

Mr. Welch—I move that it be declined, with the thanks of the Convention, and an expression of the appreciation of the kindness of the Company in extending it.

The motion was adopted.

PERMANENT ORGANIZATION.

The President—The hour has come for the consideration of the special order, which is the report of the Committee on Permanent Organization.

The report was received and adopted.

Mr. Folwell—I move that the discussion contemplated by the report take place now.

The motion was adopted.

Mr. Folwell—I do not wish it to be thought that I had any special proposition to bring forward here. I would remark, if you please, sir, that, coming here quite unexpectedly, I did not know what I was to

find here, or whom I was to meet here, exactly. And when it was proposed here to form a permanent organization, the question immediately arose in my mind, of whom shall this association be composed, what shall be its constitution, and what shall its object be? And, as a member of the committee to which that matter was referred, I did not feel willing to begin to draw the articles of our association until I should know something about it from a discussion of a kind that may now take place—what has taken place, and what is wanted. I will say, very briefly, that for my own part, if there shall be a permanent organization, I would wish that it would be a practical one and a broad one; that it should exclude nobody; that it should not be confined to agricultural nor mechanical matters exclusively, but to embrace all subjects which may properly be brought within the scope of the institutions founded by the land-grant of Congress. I suppose we can do no business in the matter now. As we do not come here as delegates from our various institutions, we can not do anything which will commit them.

Mr. Flagg—I suppose in holding this meeting we are exercising the inalienable right of American citizens of forming an organization for any purpose we choose. Of course we can not commit anybody but ourselves. We are simply here as individuals. While what we may do here will not bind anybody, it still may have very considerable influence at home. It is not in our power to bind anybody except so far as we are concerned as individuals.

In regard to the calling of this meeting, with which I had something to do, I can only state my own views, and leave others to do the same. This organization arose primarily from a consultation that Dr. Miles and myself were having at Lansing in reference to agricultural experimentation. It is very clear to any one who has considered the subject at all, that very great advantages could be derived by co-operation in experimentation—a subject which both of us had a good deal at heart. Having gone thus far, the further consideration arose that this experimentation is to be done largely by the agricultural colleges, probably, and involve the agricultural colleges generally, and they again would involve pretty much all or a large share of those institutions founded on the national grant for the advancement of agricultural and mechanical arts, and they would include again a very large portion, perhaps nearly all of the institutions that are seeking the new education—I believe that is the term—so that there is quite a bond of unity running through all this, which would make it desirable, in many respects, not only to have those who are engaged in agricultural experimentation in the various agricultural colleges interested in this matter, but there are some pretty strong reasons—perhaps from the community of sentiment and community of interest, and the possibility of our needing a defense—there are a good many reasons for forming a permanent organization, which should be tolerably broad in its character. Primarily, the gentlemen who first called

this meeting, were seeking to carry out these agricultural experiments in common—to get our whole country at work, if possible, in the matter of improving the scientific basis of our agriculture. That itself is a great work, and one which will involve a great deal of time, and might, perhaps, fully occupy any convention that we should be able to hold. At the same time, in view of the fact that there has, I believe, no convention whatever ever been held of the presidents of our agricultural colleges, and of those who are specially interested in their management, and inasmuch as they are new institutions, striking out a new path in which co-operation, mutual advice, and mutual experience, will be eminently beneficial, it seems to me that there are pretty strong reasons for making this organization very general and broad in its character.

I merely throw out these general considerations now, Mr. President, with the hope that those who have considered the interests of the agricultural educators will speak further upon it.

Mr. Miles—It seems to me this question narrows itself down to the proposition whether it is desirable to continue an organization here which has been called for an especial purpose. The persons here in this Convention representing, to a large extent, the subordinate officers of the colleges which are engaged in this particular work, the primary object of their being called here, as stated by Mr. Flagg, was to get them to co-operate. It seems to me that they have a right to organize for their mutual improvement and benefit, for the promotion of the object they have in view. If the proposition is to have an organization uniting or bringing together the industrial institutions that have been organized under the Congressional grant, for the purpose of comparison of views in regard to the manner in which these institutions shall be conducted—the course sought to be pursued—then this Convention should have a very different object. The faculties of the colleges and the persons in control of the colleges should be consulted and allowed to send delegates to the convention, which is to form an organization upon that basis.

It seems to me that we can do nothing in regard to organizing a convention of agricultural colleges any farther than this: that we might express our opinion in regard to the matter, and leave it for the faculties, and the parties in charge of the colleges, for the purpose of making the organization. If we choose to organize as individuals who are engaged in a common object, we can go right along and make a common organization.

The President—A year ago I had some conference with President White, of Cornell University, with reference to an organization, or, at least, looking to an organization composed of gentlemen connected with the industrial and technological schools—scientific schools of the country. And some discussion was held also in our own State. Mr. Flagg and myself held some conversation on the matter; and a good deal of interest was felt and manifested at the time. But

it has occurred to them that there is already in existence a National Convention, very broad in its character and aims, looking to the discussion of all questions relating to education in all their departments and interests whatever—a Convention that has just closed its annual session at St. Louis, and which is willing to admit as many additional sections, I suppose, as are necessary to organize under it to meet the special points and interests of any class of educators. That Convention, very many of the men connected with the institutions of learning will want to attend, as several gentlemen present have come, perhaps, to this Convention. If an organization is made of the industrial institutions for the discussion of all questions relating to industrial education, or the management of these institutions, I do not know why it could not be made there, and save us the trifling expenses and the time involved in making two or three annual trips; and thus the gentlemen who hold middle ground between the two associations would feel that they could leave that and come and attend this. It seems to me that this form of organization is needed that is composed of all the men interested in agricultural education, where we can discuss, when we meet, as we discuss here, all these questions. But on the other hand, the specific object for which this Convention is called is a proper object and a sufficient object, probably, for an organization by itself. I know that the experimental stations in Europe have an annual meeting of all the experimenters and chemists—those interested—and the rest of the institution is not represented, nor are its interests represented. They meet in the annual convention to report upon their experiments, and to discuss conditions of experimentation, and to arrange for experiments; and they meet for that purpose alone, and it is a matter which fully occupies their time and attention. The difficulty in an organization which should embrace all the interests that are represented in an industrial institution would be this, that we would be, as we are now, crowded for time. Some of us are interested in all the questions concerning these institutions, and they press upon us; they are practical questions; they are meeting us in the face as soon as we get home. We have got to battle our way through with them some way or other, and with that light or information, and with that comparison of views and relation of experience; and we can not have these unless sufficient time could be given.

Now it remains with the Convention, it seems to me, to determine whether the organization that is proposed to be made should be an organization like that of the European, for discussion upon experiments, reporting experiments, and arranging experiments; or whether it shall be a convention of educators in these schools, who will meet to discuss the general management of schools, experiments included. I think it will strike you at once as a practical difficulty, with the experiments themselves constituting so leading an interest, whether that object itself would not call us together, and when we get together we could not discuss the other questions.

Mr. Flagg—I wish to ask for information, in order to bring out another fact, to what extent our educators from the agricultural colleges find that the questions they desire to consider, are considered in the National Convention of Education.

The Chairman—My impression is that they have but little place there; that the discussions do not come upon our ground except incidentally; and that our topics at present have no very warm welcome in that Convention; and that there is a radical divergence of views between us and the men, who are leading this National Educational Convention. And so, as between the two, not feeling able to go to both, I came to this, as I shall probably do in every case.

Mr. Welch—I harmonize with the views expressed generally, with regard to the object, that such a Convention as this could react if it should become permanent. I do not fall into the idea of making this association that is to be, a branch of a national association of education. The questions that we want to discuss, it seems to me, are peculiar, and arise from the newness of the enterprise. Those immensely important subjects, that are discussed by the convention of teachers—the National Convention—have been before them for years and years. Most of us have reached our conclusions with regard to them. But with these new institutions we are facing some new problems that are intensely interesting, and that are portentous in their importance. Hence we might be trammeled by any connection with the National Association. At any rate, our attention would be more or less distracted by the multiplicity of subjects that are discussed by that body.

And then again, it might not be convenient for us to meet at the same place that they meet. And for my own part, I have not time for attending more than one or two conventions in a year. These are reasons, however, which may not appeal to most of you.

What I want to know is not whether languages are more efficient in giving general mental discipline than science—not how to conduct primary education, or to get at the exact value of object lessons, or how to teach geography; but I want particularly to know how to manage, in the solution of the new problems that we have to face the moment we organize an industrial institution, as to the admission of the sexes; as to the labor question; as to the exact relation to the sciences and their practice in the field; and as to the new problems that in the organization of these new institutions come before us in regard to college government. Such things I come to get light on. The old subjects that have been discussed from time immemorial, and which you and I have hammered away at for twenty-five years, I have laid aside.

Now, there is another point that suggested itself to me this moment. For my part, I am sure that if we, who are present here from our institutions, give our assent to this Convention, it will be heartily acquiesced in by those we left at home. And though we were

not actually elected as delegates to this Convention, yet we are considered as representing these institutions, and institutions will be bound by our actions, and, I am confident, that will be the case with all the faculties of the new industrial colleges that are not present in the Convention. And I believe, sir, that this meeting can reach or leave matters in such a shape that we shall become a permanent organization, with definite objects—one of which shall be experimentation, and another, the course of study best adapted to accomplish our purposes in the new organization, and the manual labor, etc., etc. I don't want any one question, or any one specific individual purpose, however important, to absorb the energies of the association; but I want it to gather, within its compass, all the important topics that must occupy the attention of men who have these institutions in their charge.

Mr. Denison—The remarks made by President Welch, in reference to representing the institutions of Iowa—the fact that the Faculty of that Institution, and, probably, that Board of Regents, will approve what is here done—will also apply to the Institution that we represent. The Secretary of our Board is present, and I presume that any determination of this assembly, in reference to any permanent organization, will be approved by them.

I wish, however, to say that while the objects which we aim at are distinct and separate from the objects at which the National Teachers' Association aim, it is true that we hold a relation to that association. We are American citizens. I believe that it is true that an officer of the Government to which we stand related, is recognized as one of the important offices in that Institution. I refer to Mr. Eaton, the Commissioner of the Bureau of Education, who, by the direction of the Government, has special oversight of the endowment granted to us, and of what we are doing in relation to that endowment.

I do not know but it may be best for us, at first, to be distinct from them, until we require an organization that shall be an individuality; until we, to some extent, initiate a progress more or less in the working out of the special problems committed to our trust. But I believe the day may come, and perhaps will, when this organization will be considered a section of the National Teachers' Association—that association allowing us the utmost freedom in the expression of our opinions, and in the working out of the special problems committed to our care.

Mr. Murtfeldt—The call issued for this Convention is sufficiently broad to admit a person of my standing to this Convention, I believe; and I hope that when an organization of this kind is completed, the lines will be very clearly defined. Now, we have a particular institution in the State of Missouri, that is a little different from most of the States by which it is surrounded; and a very few minutes will suffice to explain just how that is. Our Industrial University, or the

University of the State of Missouri, has twenty-two Curators; and the State Board of Agriculture is composed of twelve persons who are self-perpetuating—elected by the presidents of the agricultural societies throughout the State. The Governor and the State Superintendent of Public Schools are, *ex-officio*, members of the State Board of Agriculture; and, by the organic law of the State, fixing the location of the Industrial University of Missouri at Columbia, there are seven of the State Board of Agriculture incorporated in the State Board of Curators of that Institution. You will, therefore, see that these Curators have, in the managing of the Institution, something more than the mere care of the fund. You can readily see the intimate connection that there is between the State Board of Agriculture, as such, and the Board of Curators, and the Institution itself.

As I stated before, I think that the call was broad enough to admit me to a seat upon this floor at this time, and I want this Convention to clearly define the lines as to who shall be entitled to a seat upon this floor, and who shall not. If you say that no one but the professors or members of the faculties of the several universities in the United States shall be entitled to seats, all right. If you are going to make it broad enough to admit the presidents or the secretaries of the several agricultural societies, or the State Board of Agriculture, to seats, it is all right also. Only do this for me—clearly define what you want.

Mr. Parker—I think the questions coming before the association that is contemplated are peculiar, and, in some degree, differing from those that are discussed at the National Association; and it appears to me that it is very essential that we have such an association.

The Regents of the Industrial College (or the Curators, as they are called in Missouri,) in Kansas, meet frequently, and have long and patient discussions, sitting sometimes all night; going into session at half-past six in the evening, and not adjourning until half-past six in the morning. You can judge by that, something of the interest that is taken. The questions are new, and of the greatest importance—just how to launch forth these new institutions. We have to lay the track before we can run the engine; every mile of the track must be laid first. The old institutions—the former organizations of colleges—know what they are going to do, and what they are aiming at; but we have to combine labor in the new sense with the new education, and the form of education is to be determined.

Now, as a Regent, as one feeling this responsibility resting upon me, to know how to advance our own institution, it is a great privilege to come into an association of those similarly situated, and who have had larger experience, and who can give information upon these points that we need information upon, and I feel as though it would be just the thing, in years to come, if we can come together and compare our work, and see what progress we have made; and so go on

together, with the experience of each and all inuring to the benefit of all, so that we shall be able to judge from a larger induction.

Mr. Folwell—I sympathize very much with these gentlemen who favor the union with the National Educational Convention; I favor it for the same reason—as a matter of economy to myself. I shall probably attend the meetings of that Association, and should want, also, to come here; and would not like to take my choice. There is some hostility between the persons who compose that Association, and those of us who are likely to meet here; but I think that is not necessary any more than there is a necessary hostility between the scientific and classical systems which we have discussed. We have brought the matter down until it is merely a question of methods and means. We are substantially agreed; and I do not believe that we should lose in uniting with the National Educational Convention, or that we should find ourselves out of place there, or out of sympathy with the men we should meet there. We can go on with these very troublesome questions, and I cheerfully agree with the last gentleman, that they are some of them troublesome questions. There are, perhaps, some in that Convention who are jealous and doubtful of this new experiment that we are making. I would like to discuss these matters right in the presence of the backers of the old education.

I will add one further word about the organization to be formed here. I must confess that I did not so carefully read the call as I ought to have done; otherwise my own action in the case, as a member of that committee, might have been somewhat different.

I will say, also, that I favor a broader organization—one which will include experimentation and a great many other things; still, at the same time, I would not throw anything in the way of gentlemen who may wish to form an organization simply for that one purpose. At the same time, my advice to them, and to all, would be that we should make the organization much broader than that.

The President—I suggested joining the National Association, not because I felt myself attracted that way, but I was aware that several of our institutions are affiliating more nearly with institutions represented there than the rest of us. Some of us are seedlings, and some of us were grafted on to old institutions. The Wisconsin school was grafted on to the university; the same is true of Minnesota, and perhaps in one or two other States; and the Scheffield Scientific School is intimately related as a branch of Yale College, and the new school of Harvard will be united with the Harvard College. As to the School of Technology, it is singularly associated, I think. I don't know how that is, but the scientific school there, at any rate, is a branch. And I suppose that I threw out the suggestion simply because it might aid myself and the other officers of the association to act in the matter of permanent organization, to have the point drawn out in discussion. It is possible it might be well for the Convention to go on a missionary trip to the old National Association.

Mr. Folwell—There seems to be an understanding that there is a concession on our part, that we have interests that are adverse to other educators. We have no such interests.

The President—I do not understand it that way, nor do I think that others understand it so.

Mr. McAfee—It seems to me there is a very great call for an organization in the direction of the call that we have heard read here, and that we all have seen before. There is certainly a special call for an organization in the direction of unity of experiment among the institutions. There are, no doubt, great interests involved in respect to the institutions aside from that; but here is the special matter—the matter of experimentation. We are seeking for knowledge by experiment; we are trying to make agriculture, which is accumulative science now, accumulation of distinct facts. To organize these facts, which we can do faster and better by these experiments, it seems to me eminently proper and eminently fit that we should organize those who are connected in any way, remote or direct, with those experiments—organize them in such a way that there may be a community of the work. I think it is possible; and I think we can come together on that subject, and after that question has been decided we can organize an association for experiment there. Then, if it should become necessary to go further, and organize for the purpose of meeting to discuss the questions of the land grant, school management, etc., it might be well to include that in the organization. There is this one point that seems to have peculiar force and a peculiar meaning to my mind, perhaps because I am intimately connected with experiments—that there should be an organization in the direction of a community of experiments.

Mr. Flagg—I assent very heartily to the remarks of the gentleman who has just sat down. I think, as he does, that while the primary object of this organization should be the accumulation of agricultural knowledge, particularly, it ought to be the feeling of us who are engaged more particularly in that work, that we very earnestly desire to have the co-operation, aid and suggestions of men who are generally interested workers, as the presidents of our colleges, founded on the national grant, all are.

In making this call, and sending it out, for instance, we found a great many cases of this kind: where a university—as is the case, I believe, with the one in Minnesota—had not yet been sufficiently developed to have any representative of the peculiar agricultural interest in it. There are a good many cases of that kind. Now, where no such organization exists within these colleges, we still want their co-operation and aid; and if we can furnish them any advice ourselves, and give them any suggestions to suit their peculiar wants, it is eminently proper that we should do so; and if they can give us any suggestions in regard to their experience, it is eminently proper that we should have them.

It seems to me that practically we ought to make an organization which should be broad enough to interest all who are engaged in the general work. I think the Secretaries of our State Agricultural Societies, for instance, are men whom we particularly wish to get in. They are certainly as much interested as any one here can be in the dissemination of agricultural knowledge. That is true of our presidents of these various institutions founded on the national grant. It is true of our technological professors, I presume, quite generally; and I should certainly favor, myself, a tolerably broad organization of all interested. There are not so many of them as yet that they would stand in one another's way. The time may come when it will be necessary to go either into separate sections in the same convention, or else to form a separate convention of experimenters. That time has certainly not yet arrived, and, in order to bring this matter up, I would ask leave to introduce the following resolution:

Resolved, That the object of the organization to be formed by this meeting, shall be the advancement of the interests of industrial education, by assembling together persons engaged in agricultural and mechanical experiments and education, with a view of disseminating industrial knowledge.

I do not know whether that will cover the views of others at this meeting or not.

Mr. Miles—I think, myself, it would be desirable to have an organization of the officers of the different industrial institutions, for the purpose of discussing methods of instruction, the labor question, the endowment question, and all of these other questions. That I give as my own opinion. I have no right to represent the Michigan Agricultural College on that subject, for I come here as a private individual, and do not know what the wishes of the College would be as regards this organization. I have no doubt, however, that they would co-operate with the other institutions, and be glad to, in this general organization.

I would be very glad, however, to have a separate organization for the purpose of promoting experimentation, for this reason: that it seems to me that, if connected with any other interest, the time will be so occupied by delegates at the convention, that we can not get the full benefit of consultation in regard to the matter of experimentation.

Now this matter of conducting experiments for the promotion of the science of agriculture is valuable, and we can only make progress in it by discussion of the subject in detail.

It seems to me that we can decide upon a certain number of experiments that we can try in common; then we can come here a year from now, with the results of those experiments, to compare notes, and endeavor by discussion to get at the causes of those results. We shall then be much better fitted for the trial of experiments in the future.

It seems to me that this organization, for the promotion of experiments, for the purpose of improvement in the art and science of agriculture, would not stand in the way of this other organization, which is quite desirable—perhaps equally desirable.

Mr. Parker—It seems to me, that while that question of experimentation is of great importance—and it would be an excellent plan for the superintendents of the farm and the professors of agriculture to meet and compare notes—it is of equal and perhaps greater importance, that the officers of the colleges, who have in charge this general department, and have the appointment of these professors of agriculture, and farm superintendents, and who need to know if they are working on the right plans—that those who represent the people in the control of these institutions should have their place of organization and of consultation, because they need to have a general view of the whole subject. It appears to me that it would be extremely beneficial, if they could all come together, in one convention, where they could compare the work that they have done. I feel that we need just such an organization.

Professor Detmers—I think it is highly necessary that those who are considered practical men should come to this meeting, and find out that they are, after all, to some extent, scientific men themselves; and, which is very important, particularly, that we should avail ourselves of the opportunity afforded by these meetings, to disseminate, if we can, among as large an audience as possible, correct views as to agricultural education. In the management of our colleges we have to combat a prejudice; and the most we can desire is to have a very large audience at those meetings. We want not only states, but counties, represented.

Mr. Miles—It seems to me almost impossible for any one to discuss this subject of experimentation, unless they are actually engaged in it; they can not see the force of the arguments; they do not understand them. It seems to me it would be better to limit it to those who are engaged in experimenting.

Mr. Denison—Would not the objection be met by making the experimenters a section? They can be sections of the meeting, and discuss the matter to the fullest possible extent.

Mr. Miles—There is the difficulty. This would be included in a larger organization, and be subject, to a certain extent, to that wider organization. The difficulty that the gentlemen are trying to obviate can be got over with in this way: make the larger organization an independent one; and then arrange to have the meetings at the same time and place. I think the work of the experimental convention could be carried on more successfully and more satisfactorily, if it was placed entirely in their control.

Mr. Hamilton—I do not know whether I understand the intention of Dr. Miles in regard to this matter; whether he includes in experimenters all persons who are interested in experiments, directly and

indirectly; that is, the professors of agriculture, who are carrying on these experiments, and the presidents of colleges, who control them. Now, it seems to me very necessary that if the professors of agriculture meet together, and wish to do any effective work, in which they can engage their own colleges, they will have to have some other representative from the colleges, who have general control of the interests of their colleges. They will have to be in every convention at which these experimenters meet. The experimenters are not acting independently of these colleges; they are a part of these colleges—but a department; and the funds that they get for the purpose of carrying on their experiments, and all the assistance that they receive, they receive from these colleges; and the presidents of these colleges should be consulted in regard to any enterprise which they enter upon. It seems to me that our convention could be broad enough, at least, to include the presidents of our colleges, or some representatives from the board of trustees—let the president be the representative, if you will; the Secretaries of our State Agricultural Societies, the Commissioner of Agriculture, and other persons who are interested in this thing. And by interest, I mean those who are actually experimenters—carrying them on with a view to develop some theory—and who are willing to co-operate in this system of experiments which we intend to carry out.

Professor Hilgard—I think the difficulty raised by Doctor Miles, as to our organization becoming too numerous, can be settled upon a practical basis. The American Association for the Advancement of Science—I beg pardon for referring to it, but I think it has a good plan for obviating such a difficulty: which is by dividing the different subjects into sections and sub-sections; we have had sub-sections whenever it became necessary. Sections A and B are generally found to be quite sufficient, however, for the transaction of business; and I am sure that a good many of us who have had discussions in those sections, instead of complaining of having too large an audience, have been troubled with the opposite difficulty—that is, too small an audience. The detailing of experiments is a matter in which people will not be very generally interested. The result of the experiments is what they want, and not the details. And I think that the section of the association to which a discussion of this subject is particularly committed would not be likely to be burdened with too large an audience.

Mr. Miles—It seems to me that if we should carry out the suggestion that has been offered here—that we should get the presidents and officers of our colleges into the business—they would be glad to throw the load off from their shoulders. Now, if it is supposed that these officers are to follow each squad of men around, to see what they are doing, and where they go to: Suppose you have your geologists—are they to go around and tend to all this work, for the purpose of promoting the study of geology, for mutual improvement? Must you

call in the presidents of the colleges, to stand over them and see what they are doing all the while? Then you have other professors, and the engineer; are they, too, to join in this work for the purpose of mutual improvement? It seems to me that the presidents of these colleges, and these other officers, would be glad to be relieved of it.

If this experimental organization is made a section of the other organization, we shall then need sub-sections, and we will have a very complex arrangement. It would necessitate sub-sections for chemistry, mechanics, and experiments in physics, and that soon. It seems to me, the wider you make the organization, the more complicated it is going to be.

Mr. McAfee—I have frequently seen, where an object that has been held in view has been defeated by widening that object out, and extending it in too many channels. We used to think that an agricultural society embraced all husbandry. How is it? We have found that it is necessary that there should be subdivisions in husbandry, and that different interests should be cared for by different independent associations. You find that your breeders have an association, with profit to themselves and with profit to the country. You find that horticulturists have organized an association, independent of agriculture, which is doing a great and good work, and people in general will look carefully at this system of experimentation, for the purpose of elementary knowledge, science with agriculture, and will find that it is so vast and so grand, that they will unite with it, and make it a broad and a great organization. It is necessary that the subject should be carefully considered in the Convention. It is necessary to take all the time and all the attention that the members of such a Convention can devote to it. It is a larger subject, perhaps, than many consider it to be, until they have actually got into it, and found what it is enlarging to. And I would therefore insist that there is enough to do for an organization, which has this specifically for its object—there is enough to do in the way of organization, and experimentation, in these different institutions organized under the land-grant, to carry on the organization, and make it very interesting and very profitable in a scientific point of view.

There is another question that I wish to call your attention to. The manner in which this Convention has been called, and the words of the call, have not been the means of bringing together representatives of the governing powers—the trustee power, which governs these land grant institutions. It has brought together the representatives of the presidents of the colleges, representatives from the chairs of agriculture, and it has brought some others—some experimental farmers, etc. Now it seems to me eminently unfit and improper that this Convention should take the responsibility of organizing a body, such as has been spoken of here, which would have under consideration all things connected with this new education. Such a body is needed; such a body is eminently proper, and eminently necessary in the

United States. Such an organization has never been formed, and it is a wonder to me that it has not been formed; but that this Convention could take steps to form it, seems to me hardly possible, under the call. We can take steps here, which are eminently proper, to form an organization such as I have spoken of, for the purpose of organizing experiments.

Mr. Welch—I perceive that we have departed largely from the spirit of this call, in the discussion of the various interests outside of experimental work. I would ask our friends, who would advocate the organization of a society for experimenting, whether that is not ungermane to the purpose for which we have met; and whether we have not wandered from their intentions in getting up the Convention.

Mr. Miles—I would make a very brief expression in regard to the origin of this Convention. In the conversation that occurred between myself and Mr. Flagg at Lansing, we talked of the necessity of getting together those interested in this matter. Several of the colleges were mentioned; and I said that the presidents should be written to, where we did not know any one interested in experiments. We did not wish to limit the matter very closely at the present meeting.

I have been very glad that the discussions have taken this wide range. I am glad we have not cut down to the strict limits of that call; but for organization it seems to me desirable to limit it somewhat.

Mr. Welch—I certainly am in hearty sympathy with the object that Professor Miles advocates, and I appreciate the immense importance of a series of experiments conducted by the various colleges in common. But I confess that I did not come here expecting that an association would be formed. I am not selfish about it; but if it would reckon the presidents all out, as certainly this proposed association would, because it has been expressed definitely—if I am wrong, Professor Miles can correct me—

Mr. Miles—I did not assume to reckon the presidents out, or anybody out, but simply to bring in those who are engaged in experimenting, so that all would engage in it in common. We do not want to rule out any class of men. We would like to have the presidents here every time.

Mr. Welch—I must agree with some gentleman who has inquired whether the proposed object could not be well reached by sections. I do not think that the parent society which should have such a section would trammel it in the least; because it would have no other control over it than to fix the time and place of its meeting. Then the experimenters in that section would have the whole weight of influence, and the whole sympathy of all their co-workers in the colleges; whereas, they would lack, it seems to me, that influence and sympathy, and would lack the help, that comes from general attendance.

One of the professors has said that only those who are actually engaged in experimentations can take part in the exercisesof a meeting of experimenters. I can not think that that is exactly and strictly true; but I know there is a good deal of truth in it; because, though I do not myself take part in actual experimentation, I keep myself posted on the experiments that are going on to a large extent upon our own farm. Now, I am willing, so far as I am concerned, that this subject of experimentation should be the prominent subject to be considered in these meetings; but there are too many exceedingly intricate and troublesome questions in this new organization, to permit one single idea, one thought, of paramount importance even, to engage all the attention of the association.

One thing about what the gentleman says as to the representation of trustees here: The presidents of these agricultural colleges, so far as they are here, are presidents of the boards of trustees, I think. If that is not entirely true, it is true in most cases.

Mr. Hamilton—He is not, of our board.

Mr. Welch—He is not?

Mr. Hamilton—No, sir.

Mr. Welch—The presidents generally represent the trustees; and if they are not on the board of trustees, as of our board, they are the presiding officers.

Mr. Murtfeldt—It is not so in Missouri.

Mr. Welch—It is not so there?

Mr. Murtfeldt—No, sir.

Mr. Welch—I simply spoke of cases like my own, from which I came as an individual.

Mr. Flagg—I would like to say one or two words more in reference to this resolution. I have offered it in order to arrive at some basis of agreement. I shall be entirely willing, myself, to take up either theory; the one that Dr. Miles is in favor of, or the other one.

I think there is a good deal of force in what Dr. Miles says, in reference to the benefits which would be gained from concentration on one point. At the same time, recognizing the fact that we are but few as yet, we speak of ourselves now as interested in agricultural colleges and agricultural experimenters—men who are in the general interests of agriculture. We are so few as yet, that I do not see any great disadvantage that will arise from our all coming together and consulting. I do not know what the experience of other men may have been, but my observation is that when we get the most we can together, who are interested on all points—I do not care how broad you make it in reference to agriculture—we still lack very much of intelligent appreciation, understanding and knowledge of the conditions we are laboring under. I do not see any present danger of our being overcome with a redundance of wisdom. And I think the more we can get in of these men, the better off we will be.

Mr. Roberts—The matter of experiments President Welch and I have been engaged in a good deal this summer; and I conceive that there is too much stress laid upon experiments as a group, or as bringing the result of the different experiments together for comparison. For instance, I find it very difficult in experimenting on our farm. Let me go back a little. Having lived in Henry county, I found that the climate was wonderfully different. It is so in our own State with experiments, frequently. The experiments of crops that we tried would not produce the same results as in my own county at home. And now I conceive that on our farm there, the soil is so very much different from the soil of Illinois, where the college is situated—I mean taking the two farms, not the two different States in general—the soil of them is so different, and that soil is so very much different from the soil of Maine—the climate, and, all things considered, will have such a different effect, that you do not learn much, you do not gain much.

Now the experiments that are made on our farm there will not apply to the whole State; much less to Illinois and Maine. And so, to a very great extent, each college has got to be an experimental college for its own State, or as much of it as possible.

Now, I find one great difficulty. I take a field and lay it off in plats for wheat, of two acres each. I find great difficulty in getting those different plats to operate alike, so that the results will amount to anything. One part of the field will do much better than the other part.

There are certain things that can be learned, but it is my opinion that those experiments can not be relied upon to give us a very wide range of certain knowledge.

Besides this, there are a great many other things that may exercise an influence to make the crops different. There is the amount of the rain-fall, the backwardness or forwardness of the spring, the temperature, etc. A storm this year spoiled our oat-field, and knocked our experiments almost all to pieces; blew the oats all over. So, we have all these things to contend with. And it seems to me that it would be doing a wonderful work, if we could succeed in applying our experiments to our own States. Our agricultural papers, it seems to me, are the best, and perhaps the only means by which we can reach the end we want to reach. Professor Miles and I can be in weekly communication as to any experiments we are carrying on.

Mr. Miles—The object of this resolution was to call out discussion and get an expression of opinion. I now move to lay the resolution upon the table. The effect of this will be to leave the matter for a committee of the officers of the society to consult and plan.

I must say, that, although I expressed my own opinion very positively and decidedly, yet I have no very strong preference either way in regard to this matter. I expressed my opinion strongly, for the purpose of bringing out discussion. I have no strong preference

either way. Therefore, I move to lay this resolution upon the table. That will leave the officers of the society free to consult one another, and act for the best interests of the whole.

The motion was adopted.

Mr. McAfee—In what position does that leave the matter for consideration?

The President—It leaves it where the report left it—in the hands of the officers, who are made an executive committee, for the purpose of making an organization.

Mr. Flagg, as chairman of the Committee on Experiments, submitted a report.

Mr. Flagg—I would state, in explanation of this report, which I now make, that we could get but a portion of our committee together; but we got as many together as we could, and with what unanimity we could. In case there should be any fault found with what is reported, I hope that members of the Convention will feel entirely free to differ from us. The report is as follows:

REPORT OF COMMITTEE ON EXPERIMENTS.

The committee have taken the subject assigned them under consideration, so far as possible, in the press of other business, and would report as follows:

The field of experiment, in its widest sense, in relation to our colleges founded on the national grant, is large and crowded with work. We want—

I. Meteorological Observations:
   1. Scientific, after the Smithsonian plan.
   2. Practical, like those of the Signal Service.

II. Mechanical Experiments:
   1. In strength of materials.
   2. In native powers.
   3. In trials of agricultural and other industrial implements.

III. Experiments in physics, especially in the effects of different degrees of light, heat and electricity and moisture on vegetable life.

IV. Experiments in industrial chemistry, such as analyses of soils, of clays and other earths used in the arts; of coal, lime and building rocks, minerals, manures, plants and their products, and of animal products.

V. Experiments and observations in mining and metallurgy.

VI. Experiments with soils in their drainage, pulverization by different implements and their compaction; the application of different fertilizers; the variation of soils in adjoining plats, then continuous cropping without manure, and other irrigation.

VII. Experiments in special culture with different varieties of grasses, grains, roots, plants, trees, etc., with variations in the time, distance and depth of planting, modes of cultivation, harvesting, manuring, modes of propagation; and with insects and diseases affecting plants.

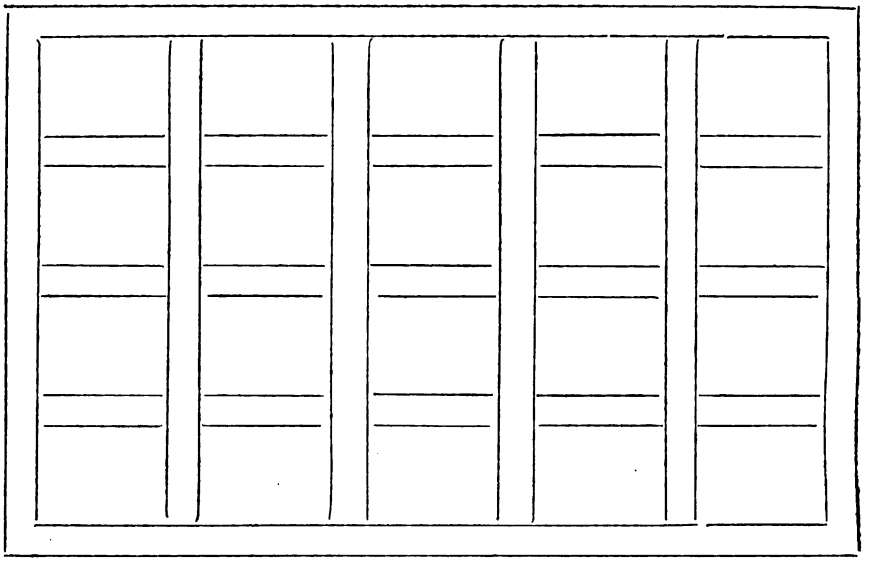
VIII. Experiments in the breeding and fattening of domestic animals, comparing different breeds and species, their diseases, etc.

We enumerate these to give those who have not given the subject special attention some idea of the immensity of the labor to be performed. To a large extent, of course, these experiments must be tried by each State, for its own people, according to its peculiar wants and capabilities. To a considerable extent, however, experiments may be tried in common, or repeated all over the country. Especially this is true of the culture of certain widely grown plants, such as corn, wheat and other cereals.

Accordingiy, we submit herewith two or three simple experiments of primary importance and inexpensive character, which we hope to have begun next year, at a large number of our agricultural colleges, and prosecuted to final results.

EXPERIMENT NO. 1.—1 ACRE PLATS, 2 RODS BY 4—4 FEET BETWEEN PLATS.

EXPERIMENT TO TEST THE VARIATION OF SOIL ON ADJACENT PLATS.



The plats should be situated on a soil as uniform throughout as possible, and which has not been manured, at least for a number of years. If possible, the soil should be tile-drained thoroughly. The aspect of the whole should be the same, and the slope should be uniform if possible. In case of lack of tile-drainage, the soil should be naturally well drained; and where there is lack of uniformity in the slope, the differences between different plats should be carefully noted. A separate analysis is desirable of the soils on each plat.

The plats should be plowed and otherwise cultivated uniformly at the same depths, at the same time, and under the same conditions.

These plats should be planted to corn in 1872, in drills, at such distance between rows as each experimenter may prefer — one stalk in a place. The same number of plants should be grown upon each plat.

No manure should be applied in 1872, and the experiment should be repeated in 1873 and 1874 also, without the addition of manures.

The corn should be cut up at a proper stage of ripeness, weighed green, each plat separately, and cured in small shocks, and when thoroughly dried should be weighed again, stalks and all. The ears should then be husked and weighed separately, first when first husked, and again when the cobs seem thoroughly dried. The pounds each of soft and hard corn should be noted.

The time occupied in planting, in going through each process of cultivation, harvesting, etc., should be accurately noted and performed, each in the dry part of the same day.

This experiment is intended to ascertain the relative differences in the natural productiveness of adjacent plats, with the view of thereafter applying manures to the soils thus proved.

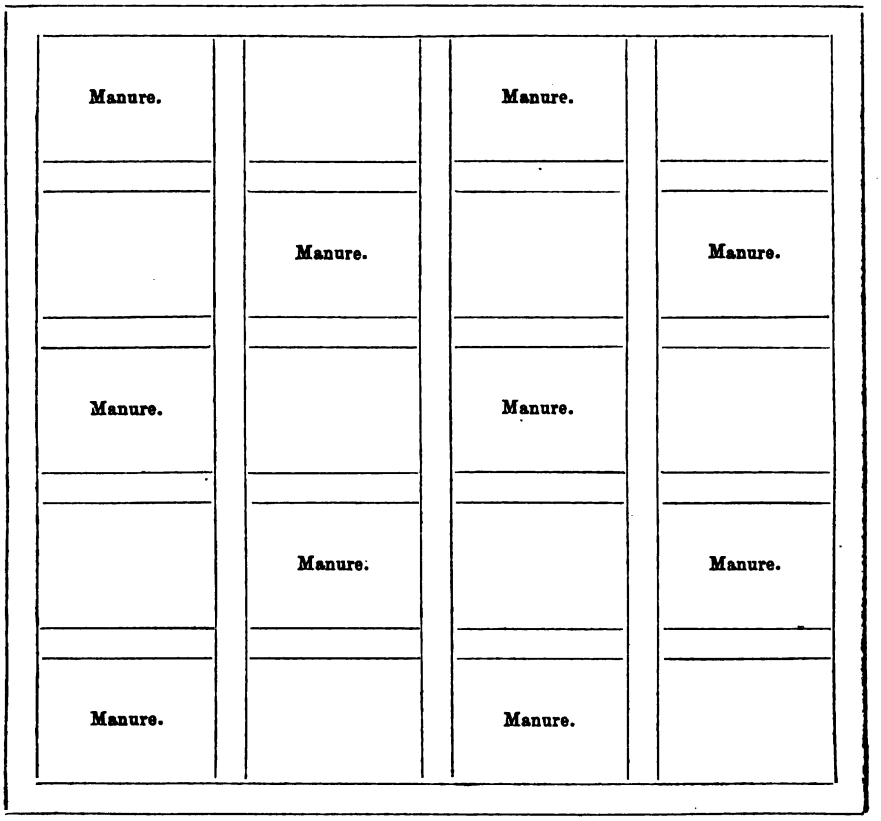
EXPERIMENT NO. 2.—PLANTING OF CORN IN HILLS AND DRILLS.

The fields planted in hills and drills should consist of a little more than one acre each, divided, as in the preceding experiment, into twenty plats, each four by two rods. Each of these fields should be as nearly as possible identical in soil, aspect and shape. In one field the corn should

be planted in hills, in the other in drills, at the same distance apart between rows, with the stalks placed at equal distances in the rows, so that the number of plants to the square rod shall be the same in each case. The different fields should receive the same amount of cultivation, and the crops should be cut up and weighed, the ears weighed separately, and the amount of soft and hard corn compared in either case, as in experiment No. 1.

EXPERIMENT NO. 3.—UNIFORM APPLICATION OF MANURES ON ADJACENT PLATS.

We recommend, as in the previous cases, the choice of uniform fields under uniform conditions, divided into plats, separated by strips of four feet. The same weight of the same manure should be applied on adjoining diagonal plats, leaving the alternate plats without manure for purposes of comparison—thus:



Great care should be taken to obtain as uniform conditions of soil and of the manures applied to it as possible.

The plats should be planted with corn, and cultivated and harvested as prescribed in experiment No. 1.

The object of this experiment is to test the variation of soils on adjoining plats, both manured and unmanured, the conditions being more complex than in the first experiment.

Mr. McAfee—I do not understand one point there, Mr. Committeeman; that says the corn shall be planted at such distances in the drill as decided best by each party.

Mr. Flagg—Such distances between rows and in drills both, as the particular experimenters might desire.

Mr. McAfee—Then there is another point. Is it provided that all experimenters who are trying that experiment shall use the same variety of corn, or such as they choose? I would remark, if that is the case, that there are some varieties of corn which may vary in small plats, and do not stand so uniform in the field as other varieties, and I should wish to have one certain variety, or some certain varieties fixed upon, that are more constant in their characteristics than some are.

Mr. Flagg—I will ask leave to explain here. As the gentleman will perceive, the point is this: to get at a field which shall either be uniform in its natural productiveness, or, if it be not uniform, to notice the differences, plat by plat, so that we can apply the manures to it after we have got through with our first series of experiments, and see pretty definitely what the effect of that manure will be. If you should have one plat on one-twentieth of an acre which would produce one bushel of corn more per year than the one adjoining it, and were to put on your manure before you had ascertained that fact, your experiment as to the manures, or comparison of manures, would be entirely vitiated, or partially so. The object, therefore, is to plant, year after year, as far as may be thought best, these different plats without manure, and ascertain their relative productiveness. If they prove equal in productiveness, all well and good, or if they do not prove equal in productiveness, we want to know it, and to what extent they are unequal. Having ascertained that fact, your committee then suppose we are ready to go on and apply manure, and, by the results, to decide to what extent it has been affected by those manures.

The President—In these preliminary experiments, you do not design any comparison between the plats of one institution and those of another.

Mr. Flagg—We thought not. I would call the attention of the gentleman from Wisconsin to this fact: that while it may be desirable on many accounts to use certain particular varieties of corn over the whole extent of country over which we hope to range, yet it would be practically impossible, because the corn growing in different latitudes varies so much in its characteristics and its wants.

The comparison that we wish to make is simply to ascertain the fact, in the first place, whether this variation of soils adjoining one another is found throughout the country that we have under experiment, and whether they all vary in this way. It would not make very much difference if the productiveness was different.

Mr. Miles—It makes no difference in regard to the distance apart, provided it is uniform. It matters not about the variety of corn. What might be a certain variety in one State might be different in

another State. Let each one select the kind that will grow best. We can ascertain then whether the soil in one locality are more local to those varieties than those in other localities.

Mr. Welch—I move we now adjourn to half-past one o'clock.

The motion was adopted, and the Convention adjourned.

AFTERNOON SESSION.

The convention was called to order at two o'clock P. M., by Vice-President Miles.

The President, *pro tem.*—The question before the Convention is the adoption of the report of the Committee on Experiments.

Mr. Flagg—The report, I will explain, is given, but not in sufficient detail as far as the last two experiments are concerned.

The committee recommended as experiment number two, the planting of corn in hills and drills; and specifying details, which they will add to hereafter.

Experiment number three is in relation to the uniform application of manures on adjacent plats, which needs to be set forth in detail also, before it is finally acted upon; otherwise, the report of the committee is complete.

I would add, that should this report be adopted, I should then move the appointment of a sub-committee to perfect details, and to correspond, and, as far as the colleges will co-operate, to carry it out—to endeavor to have these experiments tried in as many institutions as possible during the coming year.

Mr. Daniels—I move the adoption of the report.

The President, *pro tem.*—That is the question that is before the Convention.

The report was adopted.

Mr. Flagg—In order to close up this business, I will move the appointment of a sub-committee, whose duty it shall be to perfect the details of this report, and to correspond with the various agricultural colleges, and with other persons who may be deemed fit, and endeavor to secure the carrying out of these experiments in the various parts of the country.

Mr. Hamilton—Does it not seem premature for us to appoint a committee of this sort, before we have perfected a permanent organization? Will it not be well for us to wait until we have agreed upon

some form of organization, before presenting a report like this for the action of all the colleges? It might modify their action in some respect.

The President—I would state, for the information of the gentleman, that the matter of permanent organization is already disposed of. This particular business is now before the present Convention. The matter of permanent organization was referred to a committee, consisting of the officers of the present Convention, for them to correspond and perfect it. If we await their action, we will not get any business done.

Mr. Hamilton—I am very anxious it should be accomplished before we leave; but I do not understand the present situation of things.

Mr. Flagg—I would add, in explanation, that the very reason of my making this motion was the fact that we have no permanent organization—that is, a continuous one, fully officered; and I wanted to secure immediate action in obtaining these experiments, although our organization is not perfected; otherwise it would properly go into the hands of the Executive Committee.

The motion was adopted.

Mr. Daniels—I move that Mr. Flagg, Mr. Miles and Mr. McAfee constitute that committee.

Mr. Flagg—I hope I will be excused from serving on that committee, in order to have some gentleman from further East put on in my place. I think it would be well to have these gentlemen distributed as much as possible. I would nominate Mr. Hamilton.

Mr. Hamilton—I am very certain that Mr. Flagg will fill that position much better than I could, although I feel very much interested in it; but he has had probably more experience than I have, in this matter. I am willing, however, to act on the committee if it is thought desirable, but I would not like to take the place of so good a man as Mr. Flagg.

Mr. Flagg—I would move an addition of two members to the committee.

The Chairman—That would make it too cumbersome.

Mr. Flagg—I should like to have a representative from Pennsylvania. I hope Mr. Hamilton will consent to act.

Mr. Hamilton—I think if there were probably more members on the committee, it would enable us to act probably more intelligently than when we are so few. It might be better to have the experience of men in different sections of the country, so that gentlemen from the South, and those from the extreme North, can have a voice in this matter, it seems to me, to take into account and regulate the characteristics of their countries. I will make a motion that two persons be added to this committee, which shall consist of five instead of three.

The motion was adopted.

Mr. Flagg—I nominate Prof. Hamilton, of Pennsylvania.

Prof. Hamilton was elected.

Mr. Miles—I nominate Prof. Prentiss, of New York.

Prof. Prentiss—I would nominate Prof. Caldwell. He would probably be able to serve the committee much better than I would be able to do.

The meeting then adjourned to 7½ o'clock P. M.

EVENING SESSION.

Convention met pursuant to adjournment.

Mr. Flagg suggested that some action should be taken to remunerate the publishers of "The Prairie Farmer," who have secured a short-hand report of the proceedings of the Convention, at a considerable expense, either by ordering a large number of the papers containing the report, or by having the report printed in pamphlet form.

After discussion, on motion of Mr. Flagg, the matter was referred to a committee consisting of the officers of the society, with power to act.

Mr. Flagg was requested by the Convention to attend to the revision of the copy before publishing.

The order of business for the evening was then taken up—being Experiments at the Pennsylvania Agricultural College.

Mr. Hamilton—The Agricultural College of Pennsylvania, Mr. Chairman, was opened for students in 1859—among the first of the colleges of the country to throw open its doors for the admission of young men whose object in coming there was to get a better knowledge of the principles of agriculture. The gentleman who conceived this idea had for a long time before been thinking of the matter, but it had not taken proper shape until about 1856, when the question was agitated as to the probability of the States being able to get land to endow colleges such as these. It was seven years after this time that these States did get the land, the first bill being defeated by Congress, as you know. The college began right in the woods. It was not, as the gentleman stated here the other day, in a state of nature; it was a sort of unnatural state. The ground upon which the college was built, and its farm, was full of roots—of what we call grubs in our country—of land that had been cut off repeatedly for timber and for ore furnaces; so that they had to go to work right in the woods. It cost twenty-five dollars an acre to clear our land. It was, in addition to that, very stony, and we had all these difficulties to contend against. The college started without an endowment.

When the students first entered the college, about one-half of the building was up, but it was considered unadvisable to defer longer the opening of the college. Dr. Pugh was its first president. He, as you all know, was a gentleman eminently qualified for this position, for the position of president of an agricultural college. He had a peculiar knowledge; he had a special training for this business. He had gone to Europe and studied there. He had taken his degree of Doctor of Philosophy in Germany. He came to England, and was connected with Lawes and Gilbert in their experiments. He was a first-class chemist, an extraordinary man, versed in pretty much all of the sciences with which we are acquainted. He was not a literary man, in the sense that we mean when we speak of a man who has an intimate acquaintance with the ancient languages; but he had an acquaintance with the modern languages, and was a very well educated man; and, besides this, he was what we called practical — that is, he had good common sense, and he knew how to apply it. I know that the term has become rather offensive here, but it expresses the idea. During his administration, the college was filled with students. They turned a great many young men away; they took but the best young men, who seemed to have ability. They made a mistake, however, in putting their terms entirely too low—only $100 a year. This put the college in debt; it could not run at that rate. They hoped, with the great number of students and the amount of income that they would derive from them, to pay all expenses.

The corner-stone of this college was educated labor. Dr. Pugh objected, when he took charge of the college, to this principle of labor that the trustees had impressed upon it. They told him that the labor question must go with this college; that it was the distinctive feature; that it was in this that they differed from other colleges, in making labor honorable and respectable; and they told Dr. Pugh plainly that if he did not wish to take the college on these terms, then somebody else would have to take it; that if there was any distinctive feature in their college, if they had any idea of what an agricultural college was, it was that labor must be connected with it. This labor was carried to a greater extent, probably, than in any other college in this land. The students did everything. When I say that, I mean that they did everything. They went to the kitchen, and they did the cooking; they waited on the table; they washed the dishes. They did all the work that was done on the farm, and in the garden, and in the nursery, in the work-shops, in the college, cleaning out halls, cleaning out privies; all the work was done by the students. Each student was required to work. This was carried on during Dr. Pugh's administration, until about 1864. The college was successful up to about that time — when he died. I may say that, about 1863, a good many of the students went to the war. This was its first stroke. The building was completed, and when it was completed, had a load of debt of some $80,000 upon it; this was in the shape of bonds, and

the interest on these bonds had to be met. The students who left this college at that time did not come back. They got into the army, and then came home and went into business. Dr. Pugh, in the mean time, died, and the college, for almost a year, was in a state bordering on chaos; the professors of the college attended to the finances, and also to the administration of affairs. The students were discouraged to some extent by this want of organization.

At the beginning of the year 1865, Dr. Allen, of Philadelphia, who was formerly President of Girard College, was elected President — a very able man, and one eminently fitted for this position; a farmer himself, and a thoroughly practical man. He brought a good number of students with him, but, at the end of two years, owing to some difficulties which I will not explain, he was desirous — compelled by his circumstances—to leave the college; there was no inharmonious feeling between him and the officers, or the college, however. It was entirely a matter of his private affairs. This was unfortunate; students went with him. Gen. Fraser then came in. Dr. Allen, I may say, tried to modify this labor system; he told the trustees that if they would do away with this labor system, he would fill the college inside of two years; and an effort was made in the faculty to do away with this system of labor, and it was abolished to a great extent. The students, at that time, were not required to do these offices in the kitchen, and dining-room, and to work about the buildings, so much. Dr. Allen left us, and the college began to decline.

Gen. Fraser, who was at Canonsburg, came there and took the presidency of the college. He drew up a paper that was signed by the faculty, protesting against this matter of labor — an able paper, which I wish would be read by the members of this Convention, each of them—giving the reasons why the labor system was not practicable, why it was not profitable. I will not give an opinion as to the value of this paper. I have some views that differ from it to some extent, yet there are many suggestions in it that are valuable. He gave the matter a thorough investigation. The consequence was, that the Board of Trustees, who had established a college in which they laid the corner-stone of labor, changed their views, and said that they would allow the president of the college to carry on that institution without labor; did not require the students to work, but allowed them to work, and a compensation was given to all such as desired this opportunity. This was carried on until the latter part of 1868, when Gen. Fraser left, having been elected to one of these Western universities, in Leavenworth, Kansas. He took charge of that university as president, and has succeeded, I understand, very well.

Our college, by this time, had become so depressed that it had run down to about twenty students, although we had a faculty that would compare with any college in this land. They were gentlemen eminent in their departments. In zoology, Prof. Clark, who is probably second to none in the country, and in chemistry was Dr. Caldwell,

now of Ithaca, and gentlemen of like stamp in all these departments; and each department was divided up, presenting every opportunity for a student who desired to gain a first-rate education.

I go into these details for the purpose of introducing this thing, to show our condition at the time when we inaugurated this experimental farm; partly to show you the progress of this labor system in our college, where it was, as you see, tried from one extreme to the other; and afterward, if time will allow, I will give you our present status in this respect of labor, and, maybe, a little bit of military history.

But, at this time — the fall of 1867, or the fall of 1868 — the trustees became alarmed about the college. They thought that we were certainly now broken up; that all the money that had been expended, and all the trouble that they had gone to — and it was not a little — had been in vain. The trustees met at Harrisburg, to consider the state of the college—what they should do in order to resuscitate it—what they should do in order to commend it to the public. It seemed to have lost the confidence of the public, and in the course of their deliberations, they resolved, as they had not sufficient time themselves to determine the matter in their session there, to appoint a committee who should take this matter into consideration, to see what should be done. They had done everything that they knew; they had established a curriculum that was an honor to any college, and now they cast about to see what else they should do. All of these things had failed. They appointed this committee, and they immediately went to work. They began asking people what this college ought to be. They wrote to the people; they consulted their friends; they consulted men everywhere—other colleges in regard to their success—to see wherein we did not meet the public wants; why it was that we had lost confidence, and why it was that we could not get students. We had this endowment; the land scrip had been given us entire. Now, what we wanted was students. We had all the materials, all the apparatus that was necessary. And the consequence of the whole thing was, that this committee, after a great deal of exertion, came to the conclusion that they found two things that the people seemed to need. They seemed to think that the sort of education they wanted was an accurate knowledge of the process of agriculture by actual experiment. They had tired of theories. We had been theorizing on agriculture, and doing our best to give the theories in connection with it, and these gentlemen had failed to see that they were of any value. Our experiments that we did carry on—and those we had were carried on by a gentleman who is a chemist, and who is a very careful man — our experiments amounted to nothing; owing to their transient character, they elicited from nature but very vague replies.

This committee found out another thing: that our best farmers thought we ought to carry on a series of experiments at the college to

demonstrate these points in agriculture; that there should be something practical, something that would show to the people where this money that we received did go; that they would get some direct return; that all the citizens of the State should receive benefit from this grant, and not only the boys that came there, but that men everywhere, that agricultural men, who had had experience in agriculture, could learn from an agricultural college; that it should not only teach boys, but it should teach men; that it should not only teach theories, but it should teach principles in agriculture that had been developed from theory by practice; that these were the things they wished. They were tired of these theories advanced in books—a multitude of which are fruitless—and men of means had experimented until they had given the matter up in disgust. Some men, too, felt that there was a necessity for these experiments being carried on at the college, because the college received money for this purpose, and private individuals could not afford to carry on a series of experiments from which people could derive much benefit, owing to the cost of the experiments.

Another thing was, that they could not hope to carry them on for any great length of time, and another matter which affected them was that, their farms changing hands by the death of persons, these things might go for nothing, and nobody would profit by their experience. And so the committee reported to the board that there seemed to be a demand for some plan by which this scientific agriculture could be reduced to practice, by which people could be made to feel that we were working in their interests. The board of trustees seemed to see the force of the argument of these gentlemen, and the result of the matter was, that they placed this whole subject in the hands of a new committee, and gave this committee the injunction to draw up some plan for the working out of their ideas, and it resulted in this: that they considered that a series of experiments should be carried on at the college farm; that a portion of our college farm should be put aside for the purpose of making these experiments; but in considering the whole matter, and in attempting to draw up a line of procedure, some system by which they should be governed, they found that the difference in soil and the difference in climate must be considered, and that in order to give the widest scope, and that our experiments might produce the greatest benefits, they thought that it was necessary to test these experiments in different parts of the State, similar experiments under different conditions, as isolation, elevation, temperature, and so on. They then reported to the board this much: that they thought some plan should be devised by which the college could distribute its experiments to different parts of the State. The matter was concurred in by the board; they saw the force of the argument, but they did not see how it could be accomplished. The college was too poor to buy; it could not buy these farms, and it could not rent them, because it was inconvenient;

they could not rent them for any considerable length of time, and nobody would give them to them; so they did not see what could be done. After a good deal of consultation, it was determined to go before our State Legislature and just present the matter to them. We were a little afraid of the Legislature—that they would partake of this same prejudice that had existed against the college through the State.

The Chairman—Allow me to state that there are some gentlemen who will be obliged to leave by the trains who would like to hear of your experiments, and the historical part ought to be omitted for their benefit.

Mr. Hamilton—I will go over the matter briefly. The three farms were instituted by the Legislature appropriating one-tenth part of the principal of the college scrip for that purpose, and the farms were located by a committee of the board, after a great deal of trouble—one in Chester county, one in Indiana county, and one at the college in Center county, one hundred acres each. About thirty-five acres of these farms was set apart as experimental farms. The other was farmed as a model farm. The programme of experiments, I may say, was drawn up by the committee of the board of trustees, and other gentlemen from different parts of the State, who were interested in agricultural experiments. This programme, as it was drawn up, was made irrevocable. No matter if a professor of agriculture in the Agricultural College, or the President of the Agricultural College should leave—no matter what should take place—this system shall be carried out; it is the action of the board. It was got up by the board of trustees, and these experiments were imprinted here by the board of trustees themselves. They are irrevocable; they expect to carry them out as they are, allowing those plats that have received any error to go through, and noting their errors, counting them of no value, but not changing the system, because some of the plats have been found to be erroneous.

The committee which drew up the plan considered that there were three points upon which men desired information. One object of the experiments was to demonstrate the rotation of crops and the methods of culture. Another was the different applications of manure and their effect upon soils. Another, the different sorts of grain; trying experiments as to the comparative value of the different sorts of grains, seeds and vegetables. These were the three ideas which they intended to develop, and all their experiments were made to tend to this end; the object was to have them tend in this direction.

The matter of rotation of crops was tried very cautiously. They saw the difficulties that were in the way, and they agreed that the common system of rotation of crops was probably the safest one to take at first, so they took what we call a five years' rotation of crops. The first would be corn, the next would be in barley, or in oats, or in potatoes; and the next would be in clover, and the next year in

clover, making a five years' rotation of crops. This is the rotation of crops that is common there.

A few of the experiments go to show the effect of a change from barley to oats, or from barley to fallow, but these are the only experiments in the rotation of crops that we have.

The next object was in the methods of culture, and in these methods of culture they used different sorts of plowing—for one thing, the difference between shallow and deep plowing—to continue these experiments year after year, and see the relative value of shallow and deep plowing in our soils. These are matters that are of great importance to us, for if we have to sub-soil our land, it involves almost a double expense. To be profitable, sub-soiling must effect great results, both in produce and in the improvement of our land.

They form a comparison between two plats. They found that it was necessary, in order to demonstrate anything in this matter, to make but one experiment upon one plat.

I think I have gone a little too fast in telling you of this rotation of crops. There are five tiers of plats, running up to 44, making five times 44—220 plats altogether. An experiment is tried in the five years' rotation, on five plats right through. Plat 1 would be in corn one year; next year 101, receiving the same treatment that 1 did, would be in corn, and 1, instead of being in corn, would be in barley; and the next year 201 would be, we may say, in corn, and the one before that, 101, would be in barley; the one before that, No. 1, would be in wheat. So on; 301, in the fourth tier of plats, the fourth year, would be in clover; the one before that would be in wheat; the one before that would be in barley, and the one before that would be in clover, and so on, continuing these experiments through these five years' rotation, and giving to each of these five plats the same method of culture.

We have, then, another principle besides this matter of methods of culture, which is, to test the different ways of planting seeds. Take corn, for instance, to see which is the best, to plant end grains, to plant butt grains, or to plant center grains; to plant grains one foot apart in a row, six inches apart in drills; or to plant them three feet apart in hills, with three in a hill, or two feet apart in hills, with two in a hill, and various other experiments in regard to different ways of planting corn.

Then they tried the effects of fertilizers. Notice, each of these experiments has a distinct system of plats to itself. And so in the matter of manures. We have lime—25 bushels to the acre; lime, 50 bushels to the acre; lime, 100 bushels to the acre; lime, 200 bushels to the acre, applied in different ways, to show its relative merits, its effects upon the land, and to see how long those effects continue. All these are compared with land that is not limed, that never has been limed, and the plats lie as nearly in the same condition as possible. They are in the same slopes—if possible, on the same sort of

ground—not going from clay to slate, or to any other sort of ground, but retaining the clay for the same experiment.

Different sorts of seeds are used; the advantage of sowing half a bushel of wheat to the acre, a bushel of wheat to the acre, a bushel and a half, two bushels, three bushels. The same way with timothy seed or clover seed, giving the different ways in which these things shall be sowed, and see by comparison, by weighing the result, and accurate observation, what the relative differences are between these series of experiments.

There were gentlemen, too, in our State, and in other States, who were anxious to compete in the matter of artificial manures. A series of plats were set apart for them, and they furnished artificial manure, different compositions, giving certain statements as to their composition. We bought in the market, without the knowledge of these men, certain other quantities of these manures, so as to test the fact as to whether they were genuine articles or not; whether they were a fair sample or not. These manures were applied, and their virtues are expected to be determined to some extent by these experiments.

We have, besides that, another tier of plats for experimenting in grains, different varieties of grain, seeds and vegetables. These are set apart entirely to this purpose, and seeds are put on those plats, and acclimated—brought into such a condition that although they might not succeed the first year, yet they are tried again and again—and attempts are made to acclimate these seeds; and one of the objects of this whole matter of experimenting in these different seeds is to find out what seeds are adapted to one sort of climate, and find what seeds are adapted to our own State; and then, when we have found out a number of varieties that seem to do well, and tried them on our model farm, and thoroughly tested their virtues, to distribute them to the farmers over the State, at the regular prices of wheat, not charging the fancy prices that men charge who keep wheat for sale and make a business of experimenting for profit, but to give them at ordinary prices. The idea is to disseminate these seeds through the State, that farmers may get the benefit.

This, gentlemen, is, in brief, an outline of our series of experiments. We publish these experiments in pamphlet form. They are only what you see; we do not, as yet, attempt to draw any conclusion whatever from them. It is done exactly as the programme has prescribed; that is followed out to the letter. Wherever, through accident or neglect, any discrepancy does exist, that is noted on the books, and will be considered in any general collection of these things, or any report that may be made of them when it is attempted to draw conclusions. We think that if these experiments are carried on for a number of years, and are then compared one with another, probably some light will be thrown upon these three objects which we have attempted to experiment upon, namely: the rotation of crops, and

methods of culture; the relative value of different sorts of artificial manures and fertilizers; and different values of seeds, grains, vegetables, etc., that are cultivated by farmers.

We have a system of book-keeping, which I will not present to you, as it would take up more time than would probably be desirable.

The Chairman—I would like to inquire of Professor Hamilton whether you have any guesses.

Mr. Hamilton—We give exactly what we get. Our report is just exactly what we have received. We make no comment on it one way or the other. It is in exact accordance with the programme that has been prescribed by the board of trustees, and carried out to the letter. These things are weighed exactly, weighed at different times, under different circumstances. This does not give all that we have in connection with the matter. It is given merely as a sort of synopsis of the experiments. We have in our books a more complete account. There is no guessing at anything.

The Chairman—My point is this: You say you don't publish the result. My question is, whether among yourselves you didn't have some hypothesis—didn't have ground for some shrewd guesses as to what the result would be in some respects.

Mr. Hamilton—There has not as yet been anything sufficiently developed to give us ground for anything of that sort. One curious thing that we have this year—it is a curious thing; it may not do it again; we don't know, and that is the reason we want to try it if we can—was that our fallow went ahead of all our land; that we raised forty-two bushels of wheat to the acre off of fallow, and these plats are one-eighth of an acre plats. That surpassed our others very much. It could be told by anybody looking at it; but whether even that is profitable—whether it is profitable to allow the land to lie and go to fallow—is another question. All these things come in when the result is made up. That is all we pretend to give, just the things as they are there. They are in accordance with this programme that has been prescribed, and we don't pretend to draw any results as yet, thinking that it will be premature, and that no man can draw results from single experiments. For two years this has been in operation; this is the third year.

Mr. Flagg—Do I understand you to say that the fallow is a part of your common system of rotation?

Mr. Hamilton—It is in some instances.

Mr. Flagg—You mentioned that you had adopted this system that was common in Pennsylvania of the rotation of five courses, of which a fallow, I understood you, was one.

Mr. Hamilton—A fallow is sometimes used. If land is weedy we use a fallow oftentimes, to kill the weeds; or if it is disposed to go to certain sorts of grass, we use it for the purpose of killing the grass; or if land is rather poor, we use a fallow, feeling that it eases the land, and gives it the benefit of the action of the elements during the sum-

mer. The best farmers farm every acre of their farms each year; no waste land; every acre must produce.

The Chairman—Any remarks will be in order upon the report made by Professor Hamilton.

Mr. Flagg—We have not heard from Wisconsin much in this agricultural experiment matter.

Mr. McAfee—I wouldn't like to trespass upon the time. If this miltary matter is a matter of considerable interest, I don't wish to take time.

The Chairman—Every thing is of interest.

Mr. McAfee—I can give a short history of our experimentation, but it is for so short a time that perhaps it would not be of any great advantage. Only this year is all I know about it.

Our experimental farm is located upon the Huronian drift. The soil is mixed—composed of a detritus of a drift which has come from the north, mostly derived from granite and trap rocks, and is somewhat sandy. It is of such a nature that you can not tell by an analysis of the soil on one square yard what may lie on the next square yard; but as it was mentioned here, to-day or yesterday, that the analyses of soils are not to be relied upon, I think there is a plain case where they are not to be. There is also an admixture among this drift of the older formation, some of the later, fine stone and sand. This lies on the shore of Lake Mendota, and is perfectly level. Some of it needs under-draining; it has not had it. We have only thirty-three acres under the plow. As I have 146 experiments running this season, they were necessarily divided up into small plats of ground.

The first thing that was taken into consideration this spring, in laying out a series of experiments, and the thing of the most importance, was a line of experiments in which we can reach results soonest, and communicate these results to the agricultural classes who are looking to these colleges for information, soonest and with the best results; that is, the testing of a variety of different crops. We all know that seedsmen and these private experimenters who are spoken of are very busy in pushing their commodities before the public, and there is a great deal of swindling and humbugging, naturally; and if any institution, with the dignity and with the reputation that one of these industrial institutions has, can be brought to test varieties as soon as possible, no matter what the seed costs, test them just as quick as possible, and let the results that follow—the actual results, without very much comment—go out among the people, there is no doubt that a great deal of money can be saved to the agricultural classes, and that some knowledge can be disseminated in that way. Therefore, we have tested, so far as we could get varieties, varieties of different kinds of grain. We tested some eleven or twelve varieties of oats, and a number of varieties of wheat—I did not bring my books along, and I can not tell you exactly how many—and a number of varieties of corn and barley. Our experiments have been generally what

I call successful experiments, for the reason that we commenced in the spring, and we have not as yet detected any errors. That is what I call a successful experiment. I don't care if you don't raise a crop—if everything fails—it may be a successful experiment, if you succeed in trying it right straight through, and don't find any errors in it, and have reason to believe there is no error.

In this connection I wish to say one word, with all deference to higher authorities, about something that Prof. Miles said, I believe it was yesterday. He was telling us about elements of error. I don't like the use of that word "error." There are conditions which prevent certainty of results; there is no doubt about that, but why are they errors? I can't see it. I think that if persons try an experiment, and in their measurements and in their weights they are just as accurate as circumstances will allow them to be, it is reasonable and proper to say that there was no element of error. There is an element of uncertainty running all through it, because we can not control the elements. We can not bring the rain when we want it, or clouds when we want them. We can not control the constitution of the atmosphere. There are thousands of things that we can not control. Those are elements of uncertainty, but why are they elements of error? If we try an experiment on a tract, and try it carefully and fully, and don't get our ideas wrought up to such a high pitch, that we are going to fix results from that one experiment, there is no error about it. If we think we are going to discover the laws of nature and understand the science of agriculture right off, we are in error in the beginning, and the error is not in the experiment. The science of agriculture is an accumulative science, and never will be all known in all human probability.

We next tried a series of experiments in reference to the durability of wood, for the reason that the fencing problem is a very large problem in the West, and we wished to try experiments upon the durability of wood, by using artificial agents. We tried a number of these experiments, and, of course, the results can not be known for a number of years. Whenever wood rots, that we have tried to preserve, why we know that that experiment is completed as far as that wood is concerned. If some of them last forever, we will never complete the experiment. We have not as yet tested but one piece of European larch, which is said to last pretty nearly forever, and, of course, we will have to wait a long time for that.

Mr. Flagg—I want to ask you how many sticks or posts, or whatever you use, you put under the same conditions?

Mr. McAfee—From 25 to 150.

Mr. Hamilton—What size?

Mr. McAfee—They vary from two inches in diameter to four. One of the experiments is testing them top downward, with medication. Another experiment is testing them top upward, with medi-

cation, and then a lot not medicated at all, put top downward and top upward.

Then another experiment is in regard to the amount per acre to be sown of small grains, wheat and oats. We did not test it as to barley. We took the amount of wheat, from three pecks to the acre, broad-cast, up to two bushels to the acre. We ran the experiment with oats, from a bushel and a half to the acre to three bushels to the acre, varying half a bushel each time.

We organized a series of experiments with deep and shallow plowing, and sub-soil plowing. This tract was planted with corn.

Another small series of experiments was, to test as to the yield of small grain to the weight of the grain, as depending upon the kind of grain sown, whether well cleaned, the heaviest grain taken in just as it is ordinarily taken out of the bin. For instance, sow a quarter of an acre of oats just as they are taken from the bin; another quarter of an acre alongside, under the same conditions exactly, with the exception that we blew the fanning mill as hard as we could blow it, and got all the heaviest grains; blew out more than half.

Then we tested top-dressing after the grain was planted, partly to show whether there would be any good results in retaining moisture by mulching, and also by the use of peat, which is black, or nearly black on the surface, as our land is a light gray, almost white, for the purpose of finding whether the color had much influence.

Another series of experiments was with planting corn. We planted corn one grain to the hill, thirteen inches apart, and were very careful in getting the distance, and the rows four feet apart; then some right alongside of it, two grains in the hill, twenty-six inches apart, and the rows four feet apart; and then some four grains in the hill, fifty-two inches apart, each time multiplying by two, multiplying the number of grains in a hill by two, so that the same number of grains is on the same area; the only difference is in the distance apart.

Another experiment with corn was, with the hills three feet and a half apart each way, and three grains to the hill, tested alongside of corn with the hills four feet apart each way, and three grains in a hill.

These are a few of the experiments. We have a number of others, and I must say, in closing the account of the experiments, that I feel very much more encouraged about the actual results that may flow from experimentation, than most of the speakers who spoke here, especially yesterday, and some to-day. The difficulties I do not believe I am disposed to underrate. I know they are immense. There are difficulties that can scarcely be surmounted by human wisdom and human contrivance; but for all that, it seems to me there is just about as promising a field for investigation from which to derive instruction in this line of actual experimentation in farm operations, as there is in any direction. I believe that it is just exactly as easy for us to find

out important facts in agriculture, as it is to take the chemistry of to-day, and find out important facts in organic chemistry.

Mr. Miles—In this experiment with a different number of kernels of corn in a hill, how many plats of each had you?

Mr. McAfee—One plat of each only.

Mr. Flagg—How large?

Mr. McAfee—I could not give you the area of each.

Mr. Flagg—About, could you?

Mr. McAfee—I should judge it was, at the least calculation, ten square rods—one-sixteenth of an acre, I should think it was.

Mr. Miles—How many times has this experiment been tried?

Mr. McAfee—This is the first; I can say that I find no records that are satisfactory of former experiments, so I can not tell what has happened before this year. I had nothing to do with it.

Mr. Miles—Of the different kinds of grain that you have been testing, is this the first time?

Mr. McAfee—No; they were tested last year, and I found them in the bins, with the record of the weights per bushel, and the yield.

Mr. Miles—I will inquire if the same results were obtained last year as are obtained this year?

Mr. McAfee—This year's results are not completed. So far as the threshing is done, the result seems to be very similar indeed.

One more remark—it is this: I feel a great deal of interest in this question of student labor. We had student labor in our institution when I went there, and I did all I could to encourage it, and I believe that good results followed—results, probably, that may be more apparent years hence than they are now; but, from some cause or other, I understand that our governing power, the Board of Regents, as they are called, decided not to continue the student labor, so I suppose we will be without student labor in our institution. I suppose that difficult question has been eliminated.

Mr. Flagg—What has been your experience with student labor?

Mr. McAfee—I found, very much to my surprise, that, taking the average of student labor, under the rule that I was working under, the twelve and a half cents an hour which we paid for student labor, I thought was as well expended as if I had gone out and hired laborers at that price. I could have hired laborers at a higher price who would have done more work, but I think that the average of the student labor that we had on the farm was worth twelve and a half cents an hour, as the market price of labor ran. I will say, though, that I think it would not have been, if it had not been that I had the power of dockage, and I exercised that power carefully. I docked time. I classified the students. I notified them, at the beginning of the work, that I should exercise the power of dockage; if I found, from any cause, either inability to perform the work they were given, inattention to rules, regulations and instructions, and the way the work should be done, or idling, such as conversation without any results, conversing,

and stopping to converse; if I found any of these things, that I should classify them, and dock them, according as my judgment would dictate, during the month; and I classified them into A, B and C classes. A—class had full time; B—time was docked ten per cent; C—time was docked twenty per cent. I had occasion to dock one student twenty per cent., and out of fifty-four, I had occasion during the month to dock only eleven, ten per cent. The next month there was no need of any dockage at all. Everything went on first rate, and I believe there was not one of the students but what acknowledged to me personally that they believed the dockage was just and correct, and they thought it was the proper thing to do, and it did work all right. I had some little doubt about it at first.

Mr. Hamilton—Do you pay for disposition, or do you pay for work—for the amount that is done, or for the disposition to do it?

Mr. McAfee—It is a pecuniary matter, and we pay for work, not disposition. If a student has not the power or constitution to do the work that he is set to do, we don't pay him the full price.

Mr. Miles—In regard to these plats of corn, with a different number of kernels in the hill, what shape are the plats? You say they are about ten rods.

Mr. McAfee—They are thirty-two rods long and very narrow. They are in rows. I run a four foot marker through, and then I had to invent a machine to mark it.

Mr. Miles—Mr. President, I wish to make a few remarks. I don't propose to follow Mr. McAfee in regard to rows of corn. I care not whether he calls it uncertainty or error. There is something that causes variation that we can not measure. I am very glad to see that they have commenced so large a number of experiments, and I am very much pleased with the spirit with which he enters into it. I am not at all surprised, however, that the gentleman is very much encouraged in regard to results that may be derived from it, and if the experiments are continued in the present method, I have no doubt that he will continue to be pleased with the results; it will be very satisfactory indeed. But if he adopt a slight modification, I apprehend some difficulty might arise. If you take these plats, one in a place, then two in a place, then three in a place, and so on through, and when you get through, only one plat of a kind, you will be very much pleased with the result. But if you cut these strips up, and I would recommend it now, you can make accurate measurements, and draw lines across, and cut those strips up into twenty or thirty pieces, and then compare number one, number two, number three four, five, and so on, precisely the same character of experiment. You will find the result varying so you will hardly know what is the matter, and besides, if you have, right alongside of these same experiments, a number of plats treated in the same way, you will find as much difference between those all alike, as you will find between the corn with the different number of grains. There is the difficulty.

Now, in regard to this matter of different kinds of grain. I have had perhaps a dozen applications this summer for the best kind of oats. We have raised quite a large number of varieties, and have raised them for a number of years, and I can not tell which is the best. I don't know. What was the best three years ago was the poorest last year. The crops are not all threshed this year, so I don't know; I can judge somewhat from appearance. What was the best last year, I apprehend, will not be found to be the best this year. So that it becomes really complicated. The first experiments are easy, and the results are all satisfactory until you come to duplicate them. When you duplicate plats, and begin to compare between plats exactly alike, and between those under different conditions, you then find the difficulty in getting at exact results.

Mr. McAfee—That matter had occurred to me, and I can easily conceive of what the Professor has said being exactly so; but for all that, it seems to me that here is a point in regard to these larger plats, and I am in favor of the larger plats I must say, even if we have to hire extra help to harvest. All you can ever get in this thing is not absolute certainty, on account of these circumstances that render things doubtful; but you want to get a general average as large as possible, attended with as much accuracy as possible. We don't know how many people are going to die in a year to the thousand of population, but the life insurance companies come very close to it, because they have had the general average so many years that they know about how the thing runs. They know the laws of chance, as you might call it; perhaps it is an unfortunate expression. They know about how the thing will run. Now we can go so far by a great many experiments as to get a general average. The idea has suggested itself to me frequently that it would be a very good thing to divide off a lot of plats, and raise A, B and C on those plats one year, and then change—something on the system that they have in Pennsylvania—and in that way get at the actual characteristics of the actual areas; but it seems to me by subdividing areas into small plats, taking twenty to the acre for instance, we are making our labor much greater. Let us get the general average of that acre as a grain producer. For instance, we take the general average of that acre as compared with other acres of corn; the general average of that acre as compared with other acres of oats and wheat; and it is valuable so far as it goes. Now we consider that acre as either better or poorer than other acres, and go on with it. It seems to me of no use to divide the acre up into twenty plats, for if the argument is good that it should be divided up into plats of a foot square even, or an inch square, I don't see where you are going to stop if you argue in that way—that because the land gives different results on different areas you must make the areas small. Let us have the result from the whole acre. I know from the appearance of that corn experiment that what the Professor said is correct. If I cut that piece up into strips and harvest it, I know some

pieces will be poorer than others, and I believe I know the reason, (that is a guess, of course,) but that don't prove the general average is not correct as a general average.

Mr. Miles—No; but let me explain that. Divide those up, and take the general average of those. You find a certain range of variation, and then you find, on comparison of this with another, a certain result. You must deduct from that this variation; that is, you don't get as much grain as you think for, unless you take into account the variation. If the argument as presented here to-night by Mr. McAfee is the one that I have presented, I have been very unfortunate indeed: that these plats should be subdivided because of those variations, but in order to diminish the chances of variation. It is understood by every one that the slope of the plats should be the same. Now, take the plat of an acre, and it is exceedingly difficult in many places to get another plat of an acre of precisely the same slope. But if you cut that acre up into three or four pieces, you can get three or four pieces of about the same inclination. Now an illustration: take forty plats and let the manure be applied in this way: the first series of four plats is unmanured, the next is manured, the next series is unmanured, the next manured, and so on alternately through; so if I take any one of these rows through in this direction, and compare them, one-half will be manured and the other half will not. Now, if I take the same series in this direction, it will be treated precisely alike. Now, I found by some of my experiments—taking one of these series of plats through in this way—I found a variation of sixty-six pounds in the quantity of corn. Taking the plats right down in this direction—no apparent reason whatever for their variation—the variation is seventy-nine pounds. Now if I had had a single plat manured, and a single plat unmanured, the experiment would have been very satisfactory; but when we come to subdivide it and multiply it, this element of uncertainty comes in. I will not call it an element of error, if that is an objectionable term.

Mr. McAfee—I would like to ask Professor Miles in regard to this question. I regarded his suggestion yesterday, in regard to dividing off pieces, with a piece of ground between, on which there was no crop raised, as very timely and very valuable. I have seen the want of it this year. Because I did not know any better, I planted adjoining, but I believe I will never do it again if I can help it, and the question has been a matter of serious consideration as to the best way to get along with it in future; and this idea occurred to me: if I just plant so far apart, and leave that ground, of course, we know what the result would be; it would be full of weeds. I don't want the weeds on the ground. I don't want the piece of ground injured in its mechanical texture by the growth of weeds. Suppose I cultivate it—I don't think that that is exactly the fair thing either. Suppose I put it in timothy and clover. There is a plant growing there and running its roots out and injuring the plats of ground. The idea occurred to me

to make it into beds. I would back-furrow and make a dead-furrow between them; just take the soil that plants will grow readily in right out, and throw up the beds. Down to the bottom of an ordinary furrow, plants do not start so readily.

Mr. Miles—I have thought of that plan, but it seems to me objectionable. We plow our plats so as to leave the lines between one a dead furrow, and the other a ridge—each series of plats with a dead furrow on one side, and ridge on the other. When you come to dig down and remove the soil below, if you get an unfair proportion of that upon either side, you are going to influence the result in that way. Then again, the cultivation of this piece excavated will have some influence on your crops, for if you examine carefully you will find the roots running into the sub-strata. It seems to me the only way to obviate this difficulty is to cultivate through, and give the same amount of cultivation to each band as far as possible. Then you treat them all alike. Now, when the weeds spring up, with some crops the weeds get a considerable start before the crop is started. We could go through and pull those up by hand, although they might be numerous. Then, at other times, we have practiced going through with a hoe, and just cutting the weeds off, disturbing below the surface as little as possible. These are all difficult things to manage, and require a great deal of thought.

Mr. Hamilton—Let me understand what you mean by weeds. A plant out of place?

Mr. Miles—Any plant out of place is a weed.

Mr. Hamilton—We have what is called grass.

Mr. Miles—Grass we call a weed. I don't care what it is, whether clover or corn.

The Chairman—A stool of wheat in a cornfield is a weed?

Mr. Miles—Yes, sir.

Mr. Parker—These dead furrows, in our section, would not do at all, on account of the drainage. What I was always accustomed to do in Michigan, in raising a bed for onions or beets, or anything of that kind in the garden, I used to raise it from to two to four or six inches above the surface by ditches around it. Do that in Kansas, and you will lose your crop.

The Chairman—What is the cause?

Mr. Parker—The rain-fall is sudden; it does not come down in showers, but comes down in water-spouts, frequently.

Mr. Flagg—You have to do your *level best* in that country.

Mr. Parker—Yes, sir; you have to do your level best.

The Chairman—There are one or two topics I suppose we must consider a little.

Mr. Flagg—Mr. Chairman, I want to make one suggestion in reference to this matter of the succession of crops, planting one crop after another. It is this: Plant your crop one year—this year, say—in strips: corn first, oats next, wheat in the next, and grass in the last.

Next year turn around and plant across these, the same crops. In that way you would have every crop in succession to every other that has been planted; corn after corn, corn after oats, corn after wheat, and corn after grass. It is an easy way of trying the experiment of succession, and is suggested by an experimenter at Munich.

The Chairman—I find myself under some difficulty—if I may be allowed to interrupt the discussion—for I fear that we may at last get in a hurry, and adjourn without having time to think of it. I say I find myself, if it is expected that I act as chairman of the executive committee, made so by the officers of the society, under some difficulty and embarrassment to meet the other members of the committee, to compare with them upon some of the points that would necessarily come before the committee, if they provide for future meetings. It seems to me a little desirable to secure some understanding with members of the Convention before they all disperse, where and when shall the next meeting be held, if a meeting is called. I will say that it has been suggested, as a thing desirable, that the meeting of the Convention, if it continues to hold something of the character that it now seems to have, shall be held at the seat of the several institutions in turn; that we give the gentlemen, as they come together at the Convention, an opportnnity to make a personal inspection of one of these institutions, of its experimental fields and general condition.

Mr. Miles—It seems to me, if we are to continue the meetings, it would be very desirable to meet at the different colleges, and we could look over the different methods.

Mr. Flagg—There is another suggestion, and that is, that we secure more quiet, uninterrupted work, perhaps, at the institutions themselves, than we can in any city.

Mr. Hamilton—I think if we do meet, we should meet during the vacations of those institutions, so as to not interrupt the officers of the institutions in their regular duties. I would extend an invitation to the gentlemen to have it at our college in Pennsylvania, if I did not think that in another year—probably, in two years from now—we may be able to have a railroad that will take the gentlemen right there; and we have twelve miles of rough roads to go over, and it might be inconvenient. I am very anxious that the system of experiments which we have at that college, should have a thorough examination. I believe that they are important. We, in Pennsylvania, believe that they are important, and that they are worthy of some consideration, and the gentlemen who get them up are certainly not numbskulls. They are gentlemen who have had some experience in experimenting. They are gentlemen in Bucks county, in Chester county, in Cumberland county; and better farms do not exist in this country than those to be found there.

Mr. McAfee—I have no doubt that the management of the University of Wisconsin would be most happy to welcome this body to

meet at Madison at any time, if they should see fit. I think I may say there is no doubt of it. I am not authorized, of course, to extend the invitation, because it was not known that this body would continue its organization, but I can state in almost confident terms to that effect; and I like the idea of the next meeting, if we have a meeting, being held at some one of the industrial universities.

The Chairman—I will say that I shall always be glad—the next time, if it is due to Illinois to have the next meeting in our midst—to have them meet at the Industrial University at Champaign. We have railroads North and South, and East and West roads, and you can meet us quite readily.

Mr. Parker—Would it be possible to meet and not interfere with the terms, as in the Iowa institution. it runs all summer, and the others run all winter. We shall have to meet while some of the colleges are in session. But our latch-string hangs out, and we welcome our friends, whether they come on an excursion or stop on their way to the mountains, or at any other time; we shall be very glad to meet this association. I believe I am authorized, as a resident there, to invite the association to come whenever it sees fit. What is the order of business now?

The Chairman—The general order.

Mr. Parker—I would like to introduce a resolution:

Resolved, That the thanks of this meeting are hereby tendered to The Prairie Farmer Company for the very liberal courtesy extended to this Convention, in procuring the use of the rooms in which we have met, and in other kind attentions extended to us during our stay in this city.

Resolved, That we also heartily thank the agricultural and daily press of this city for their reports of our proceedings; and the officers of the Riverside Improvement Company, and the Illinois Central Railway, for their invitations to visit their respective grounds and railway lines.

Resolved, That our thanks are heartily tendered to the President and Secretary for the efficient discharge of their respective duties.

The resolutions were unanimously adopted.

Mr. Flagg offered the following resolutions:

Resolved, That the very strong commendation that the agricultural experiment stations of Europe have received from such persons as Johnson and Liebig as a source of a large amount of agricultural science and practical progress, as well as our own examinations into the subject, make us believe the establishment of not less than one such station in each of the several States of the Union, would be eminently beneficial to the agricultural interests of the country.

Resolved, That a committee, consisting of one from each of the several States in which an institution founded on the national grant has been organized, be appointed by the President, whose duty it shall be to memorialize Congress and the several State Legislatures for the speedy establishmet of such stations throughout the country.

The resolutions were adopted.

Mr. McAfee—There is one matter that a gentleman who was present here wished to present to the Convention, but he saw that the time was passing, and he had so much to do that he refrained from doing it. It is a matter of great importance, and a matter that I wish simply to announce here as food for reflection, and if we meet

again in this capacity, or any persons representing these institutions, it is worthy of being considered. It is this: how best to get a knowledge of the work of these industrial institutions, and of what they are trying to accomplish, and what they do accomplish, before the people. It is a great thing. We well know that the class of the community who are expected to be benefited by the exertions of the officers connected with this institution, are the most inert in attending to information about them. They won't even take the trouble, frequently, to send for the published reports, and it is worthy of consideration whether there is not some other way of getting the information about them—everything about them—all that we can get—before the people, and make the matter as public as need be. If there is any possibility of distributing printer's ink among them, it seems to me it ought to be done. The simple fact of getting out reports and presenting them, and having them printed, and distributing them as well as you can, don't seem to go far enough. They do good, of course, but it don't go far enough. It seems to me eminently proper that this institute should consider this point.

Mr. Flagg—I think there might be some useful hints gained from the experience of our institution in this State in this respect. I don't know but Mr. McAfee is as well acquainted with the facts, though, in that connection, as I am; he was formerly a resident here. My impression is that a good way to advertise these institutions, is to do what we are doing—that is, to go out and advertise ourselves by holding these farmers' meetings. We have held them for three years, and while the results have not been as good as I could wish, they have still done an important work in advertising the institution. I think another very efficient thing has been done by our Regent this summer, in publishing a circular—publishing our catalogue, in the form of an illustrated circular, which has been distributed to the amount of 20,000 copies, and nearly paid for by the advertisements on the covers. It was a good financial operation, and I think spread the name of the institution broadcast throughout the State, and to some extent in other States. I think that is another good way of bringing the institution before the people.

Mr. Parker—In regard to the meetings, that is a matter that we have not discussed in the society. We feel a great deal of interest in it, and have held some meetings; but one or two questions in regard to it: One is, whether the employment of those who are specialists, bringing them from abroad, is necessary, or merely using the faculty and board of control of the college—that is, the material out of which the institute is made up; whether it is your faculty—those who naturally associate with you, or whether you procure from abroad lecturers—specialists.

The Chairman—Use the faculty to some extent.

Mr. Flagg—I believe we have had now three courses of these lectures in different sections. The first winter a two weeks' course at

the institution itself, at the Industrial University; the second year one of one week, I think at the institution; one at Rockford, in the north part of the State; and one at Centralia, in the south part of the State. Last winter, I think, we had four: one of two weeks at the University; one at South Pass, pretty well toward the southern end of the State; one at Pekin, and another at Springfield; or rather a few lectures were held there without any attempt at a regular institute.

Mr. Parker—Did these follow each other close together?

Mr. Flagg—That was according as it was convenient to those participating as lecturers. In those cases we have used the professors of the University to a considerable extent, and particularly outside of the institution, where they were carried among the people, not desiring them to lecture so much at home as they did abroad. On the other hand, as far as the institution itself is concerned, it has been rather a policy to bring outsiders in, to bring the practical minds, as they are called, into the institution. The policy of that, in part, was to bring our teachers and our people into closer relations to one another. The first two years, I believe, the teaching was mostly by single lecturers—by one person; that is, each professor delivered but one, or perhaps two, lectures. During the last winter, and to some extent, the winter before, there has been considerable done by one person. For instance, Dr. Hull, who was here yesterday, and Dr. Miles, went to several places and delivered two and three lectures at the time. There were some advantages in that, but one of the more special features, perhaps, was in getting in—although they may know less about it—the practical men who are not ordinarily engaged in teaching, and are not entirely *au fait* in the matter of communicating knowledge.

We find in these cases some advantages and some disadvantages; they throw some new light on a great many matters. They aid our professors in thinking, and they waken them up, I think, to a considerable extent, giving them some new views of things, and they, perhaps, draw out the opinions and discussions of practical men which are valuable, better, perhaps, than regular teachers would do. The results of these meetings, I take to be two-fold—they instruct the teacher as to the wants—the professors who go out, at least, and who are present at the meetings—they instruct them to a considerable extent as to what the people want, the subjects in which they are specially interested and on which they want information; and I think they are valuable to the people in bringing them more in relation to men who have a more scientific method than our ordinary farmers have. I think if agriculture is going to gain anything in this century, especially it is to be in the getting hold, as our farmers are seeming to do, of a scientific method—that is, a careful induction of facts—and coming in contact with men who are scientific in their character, as most of these professors who go out to give lectures are. I think they

learn a great deal in that direction. They get hold of the reason of a great many facts, too, which they knew as facts, but did not know the wherefore of them. Upon the whole, I am inclined to believe that that is one of the most valuable features of a popular agricultural education. It has not succeeded as well as I could wish; still I think there is every reason to be encouraged that we can make a great deal of it.

The Chairman—Before we close—and I suppose the hour of closing is nearly reached, if not quite—I want to add a word or two. We have done a great deal of talking; we have taken a very wide range of discussion. We have gone pretty generally over the field, if we have not pretty thoroughly touched all the points in it. There are many points, however, that will suggest themselves to us, doubtless, when we are away, that we shall wish had been discussed, and some of us have, perhaps, now in mind, that it would have been desirable to have discussed while we were together. It is evident to every one that it was impracticable for us, within so limited a time, to meet all these questions. I shall not detain you by attempting to discuss any additional questions to those that have been before you. I want simply to make an announcement: that in this matter of military education, to which I have alluded once or twice, and hoped that we should get time for a discussion—in this matter of military education, which is a very practical one to be met, and is a somewhat difficult one to be met—I have come to the conclusion that at our institution military education is not in our way, is on the whole an advantage to us, though it costs an expenditure of funds, and will cost also a considerable expenditure of effort. We have no objection to continuing it, and, indeed, have gone so far in our preparation for continuing it, as to ask and secure the means to build a large drill hall for the future drilling of our students in military tactics. On much reflection, I finally reached what seemed to me a feasible plan for occasional military education in connection with these schools, and after consulting with the senators of this State, and the Governor, and some gentlemen from other States, I prepared a draft of a plan, at the request of the Chairman of the Committee on Military Affairs in the House of Representatives, and submitted it to him, and it has by him been laid, as I understand, before the Committee in Congress. It has also been submitted to gentlemen connected with some of the institutions in the East, who have expressed an interest in it. It is too late to detail it, because it would occupy considerable time. It is too late to discuss the question. I only wished to say this, by way of announcement, that I propose at an early day to take this plan, of which I failed to bring a copy with me—I have a copy in manuscript—to take this plan and get it printed and to send copies to you at the several institutions interested, and ask of you your criticism, and, if possible, your concurrence, and, when we shall concur in a plan that shall suit us all, then your co-operation and assistance in securing the aid of your

several members in Congress, to give to us the means as institutions, for this work that is imposed upon us. I should have been glad, if the time had permitted, but it has been better occupied, probably, to have detailed before the Convention the plan that has been devised. I only wished, to night, before we separate, to express the conviction that I have come to, that the general interests of the nation, and of our States under the nation, demand military education in a more extended form, and equally complete type to that of West Point, through all the States; and it seems to me that by a very slight expenditure, comparatively—an expenditure of less than the cost of the annual maintenance of a single regiment of soldiers—we may secure in every State of the Union an institution, equal in its power as a place of instruction to West Point, with great incidental advantages to the institutions concerned, sufficient to compensate them for whatever additional trouble may come to them. I say so much in explanation of it now that I may get you interested in it—your curiosity, at least, provoked about it.

Mr. Miles—I move that we now adjourn.

Mr. Hamilton—There is one thing that I think we ought to attend to: That before the next meeting there should be some programme of business made out, so that gentlemen could understand some time beforehand what would probably be the order of business.

Mr. Folwell—That matter is in charge of the committee, I suppose.

Mr. Hamilton—Yes, sir. I merely call attention to the fact so that it may not be forgotten.

Mr. Flagg—There is one thing more that possibly the committee would like suggestions on, and that is in reference to the extent of time which will be occupied by another meeting. I don't know but the committee will be willing to take the responsibility, but I think when we meet again—I will express my opinion, and would like to hear from others—when we meet again we ought to meet for a longer time.

Mr. Parker—It appears to me, if we met one day, at least, earlier in the week—many wish to get home; that is, they have no place to stay over the Sabbath—and if we could meet Wednesday, or Tuesday evening, it might bring almost any of us, perhaps, from our homes together at any place.

Mr. Folwell—I think we should always quit before everybody is tired out.

The Convention adjourned *sine die*.

COUNTY REPORTS.

COUNTY REPORTS.

CIRCULAR.

While some of the Reports that follow were deemed of sufficient interest to be published in full, by far the greater number of the County Reports found in this volume have been compiled by the present Secretary, from answers received in response to the following circular, issued last year by his predecessor, Mr. C. W. Murtfeldt—such facts only being given as were deemed of value to the general reading public. By pursuing this course, much useless repetition has been avoided.

J. F. W.

OFFICE OF THE MISSOURI STATE BOARD OF AGRICULTURE,
South-east corner of Olive and Fifth Streets,
ST. LOUIS, August 7, 1871.

MR.....

DEAR SIR: In order to arrive at a true condition of the agricultural *status* of your county, will you please answer the following queries according to the best information at your command, or, if personally unable to answer, will you place this circular in the hands of some reliable gentleman who will take pleasure to report:

1. What are the leading agricultural staples of your county?
2. Of which commodity do you export most? Which is second in importance, and which third?
3. How do the crops of 1871 compare with those of former years, or that of the year 1870?
4. What is the (estimated) average yield of wheat, corn, oats, rye, barley, hemp, tobacco, castor beans, broom-corn, potatoes, (Irish,) potatoes, (sweet,) flax-seed, buckwheat, white beans, or any other crop not enumerated in the above, per acre?
5. Is there any increase in cattle, horses, mules, sheep or swine?
6. Which is the nearest point to railroad (either completed or building) from your county seat?
7. Have you other facilities of transportation?
8. Where is the ultimate *western* market for your produce?

What reliable data can you give regarding immigration into your county?

Can you give any other pertinent information not provoked by the above interrogatories?

NOTE.—In all cases where the yield of crops can be arrived at from reports and data of threshers, etc., that, of course, is most desirable.

2. It is very necessary, as well as desirable, that the reply to this circular should reach the undersigned at an early day, but at farthest by November 1, 1871.

CHAS. W. MURTFELDT,
Cor. Sec'y Mo. State Board of Agriculture.

COUNTY REPORTS.

AUDRAIN—R. W. Sinclair and John. P. Clark.

The leading agricultural staples of Audrain county are — corn, wheat, oats, rye, timothy, barley, Irish and sweet potatoes.

The principal exports are wheat and oats; corn and timothy being mostly fed to stock.

The crops for 1871 exceeded an average, although the chinch bugs have materially injured all kinds of grain.

The average yield of wheat is about fifteen bushels to the acre; corn, about forty bushels; oats, from forty to fifty bushels; rye, about fifteen bushels; very little barley; and no hemp, castor beans, tobacco, buckwheat or white beans raised so far as known. Potatoes yielded but little, owing to the ravages of the potato bugs.

There is some increase in horses, mules, sheep and swine, and a very considerable increase in the number of neat cattle; the prices having been good for a few years, farmers were induced to raise them. Should the price of cattle continue as low as it is now, the farmers will turn their attention to something else.

The county seat is Mexico, which is intersected by three railroads, while two others are approaching completion — making it one of the finest shipping points to any part of the United States, directly, without a change of cars.

Since 1865, a heavy immigration has settled in the locality, mostly from the Eastern States and Germany, consisting, generally, of an industrious and economical class of immigrants, who form a most valuable addition to our population.

BATES—O. D. Austin.

The leading agricultural staples are wheat, corn and oats.

The commodities most exported are: 1st. Wheat; 2nd. Corn; 3rd. Oats.

The crops of 1871 compare favorably with those of former years, exceeding the crop of 1870 by at least 33 per cent.

The estimated average yield of crops is as follows: Wheat, twenty bushels; corn, forty-five bushels; oats, forty bushels; rye, thirty bushels; barley, fifty bushels; hemp, not raised; tobacco, castor beans and broom-corn, not known; Irish potatoes, two hundred bushels; sweet potatoes, one hundred and fifty bushels; buckwheat, twenty-five bushels; sorghum, a large yield.

These has been a large increase in cattle, horses, mules, sheep and swine.

The county seat is Butler, and the nearest point to it by railroad, Appleton City. No other facilities of transportation.

The ultimate *western* market for our produce is Santa Fe.

Immigration small during the past year.

BOLLINGER—John P. McManus.

Owing to the severe drouth of the last three months, crops in general are below the average yield of former years. Nevertheless, we have an abundance of everything necessary for home use.

The principal staples of agriculture in this county are corn and wheat.

The average yield of corn per acre this year is something about twenty-five or thirty bushels. The prospects for good crops of corn were very flattering until about the middle of July, when a drouth set in which completely burnt up late corn, and damaged some of our earliest considerably. Taking everything into consideration, however, corn grew remarkably well in some places. For instance, Mr. Seraphim Keiser, whose farm is situated on one of our highest hills, exhibited a stalk of corn raised on his farm which measured sixteen feet.

The wheat crop this year was almost a failure, yielding from five to fifteen bushels per acre. The Mediterranean or red wheat is the most generally cultivated in this county. The aggregate amount of wheat threshed out in this county will not exceed 5,000 bushels, while the crop of last year was estimated at 8,000 bushels.

The oat crop this year is about the same as the year before. It is not generally threshed out, but is put up for feed in bundles, which range in price from $2.00 to $3.50 per hundred, according to quality,

The average price of threshed oats ranges from forty cents to one dollar, according to the variety and quality of the seed. The yield per acre this year is about the same as last. The aggregate amount of oats threshed out this year is about 70,000 bushels.

Rye and barley are not cultivated to any extent in this county They succeed well, but are not of much importance as a crop here.

Sweet potatoes yielded pretty well considering the season. Crop something the same as last year.

Irish potatoes suffered considerably from the drouth—early varieties especially. The crop is below the average yield. The amount raised this year is about 20,000 bushels.

Of sorghum, the following varieties are the most in use in this county: White, Red, and Black Imphees. Of these, the White Imphee (Noe-a-ga-na) is the most valuable, as it is not so liable to fall down as the Black, grows larger than the Red, and makes a better quality of syrup than either. Cast iron mills and evaporators are taking the lead, and the old-fashioned wooden mills are thrown aside to rot and decay. The aggregate amount of syrup made this year is estimated at 16,800 gallons.

Maple sugar is made to a considerable extent in this county. There were about 11,000 pounds made this year.

Tobacco is beginning to attract considerable attention. A large amount was raised this year, which did so well that it promises to become one of our principal crops ere long. The amount raised can safely be estimated at 30,000 pounds. It succeeds as well here as it does anywhere, and does not seem to impoverish the soil.

Castor beans succeed well, but are not cultivated to any extent. Can not give an estimate as to the yield per acre.

Cotton is not cultivated to any extent in this county.

This county is pretty well supplied with cattle. There is a steady increase yearly—I can not give the exact number. There is a considerable body of good open pasture lands in this county, and cattle need very little feed in the winter—never more than two or three months.

There is considerable "mast" here this season—more than we have had for three years past. Hogs will need no other feed. They get fat enough to butcher, and with two or three bushels of corn to harden the flesh, they are fit for market.

The grass crop is about an average. Red-top is most in use in this county.

FRUIT.

A considerable amount of fruit is grown in this county. Most of the trees are seedlings, but are of superior quality. Young orchards are being set out annually, of the improved varieties of fruit; but as yet very few of them have borne fruit—not being old enough. A

great many orchards of select fruit that would have borne this year were hindered by a late frost, which entirely destroyed all the fruit buds in the valleys, and had it not been for some of our large orchards on the high lands, we would have been devoid of any fruit at all. This year's experience has taught most of us a lesson which is not likely to be forgotten. At least twenty young orchards have been set out in this vicinity on the highest points and ridges.

The climate is remarkably well adapted to fruit culture. "Hale's Early Peach" ripens here about the seventh of July; owing to the extraordinary warmth and the unusual earliness of last spring, this variety was not killed by frost; ripened during the last week in June. Pears, what few we have, stood the frost pretty well, and most of them have an abundance of fruit. They are of a very common variety, mostly seedlings. Several small orchards of the improved varieties have been started, but none come into bearing as yet. Cherries and plums suffered also from the late frost. There is an abundance of wild varieties of both these fruits here. Strange, but true, the hated little enemy of horticulturists, the curculio, has not made his appearance to any extent as yet; few of them are occasionally found in the wild plums, but I have not seen many of them anywhere else. Small fruits of all kinds succeed well in our county—strawberries especially; of the varieties in cultivation, the Wilson is most generally preferred. Gooseberries, raspberries and currants succeed well also, and are beginning to attract considerable attention. Blackberries have not been tried as yet; we have plenty of them of an excellent variety growing wild.

The grape crop ripened well here this year. Large vineyards have been set out lately, and the vines, with very few exceptions, commence bearing the second or third year.

Mr. Seraphim Keiser, of this county, has two acres in vines of all varieties, and I must say, that they are in as fine order as any I have ever seen. This county is one of the very best in the State for grape culture. The woods and uncultivated lands are completely covered with wild vines; and as yet, the insects injurious to the grape, have not shown themselves to any extent. I shall try and give a report of the proceedings of our society next year.

MINERALS.

A large deposit of hematite iron ore has been found lately on Turkey Hill, two miles north of Marble Hill, and one mile and a half from the station. There seems to be an inexhaustible bed of mineral in this hill, which, by the way, is one of the largest mounds in the county. The mine is being worked steadily, and the ore is shipped upon the Iron Mountain Railroad. Several other mines have been discovered lately, but owing to the unwillingness of the owners to lease, and their inability to work them, they are allowed to remain

idle. Nearly all the ore in this county is hematite iron ore, and the quantities appear to be inexhaustible. There are no smelting furnaces or foundries in this county as yet, consequently we have to ship the ore to other counties.

Blossoms of lead and small quantities of the ore have been found lately, which leads to the supposition that large quantities of it are close at hand. Several shafts have been sunk, but nothing of much importance has been discovered; still the miners are in high spirits, and the work goes on.

Silver, copper and zinc exist in small quantities. Several holes have been sunk to the depth of twelve or fifteen feet, but as the prospect was not very flattering, the work was not carried on to any extent.

Red clay, yellow ocher and kaolin have been found in this county, but as yet the red clay and yellow ocher have been left untouched. Of white clay (kaolin) mines, there are four in operation at present. Three of these are owned by a company in St. Louis, and one by F. Dallas, of Cincinnati. They are being worked constantly, and the clay is said to be of a superior quality. The mine owned by Mr. Dallas is located six miles south-east of Glen Allen; the clay from this mine is shipped to Cincinnati.

Marble Hill, the county seat of Bollinger, is our largest town; is situated one-half mile east of the railroad, and has a population of about six hundred and fifty. This and Lutesville (Marble Hill Station) are the principal markets.

There is a steady immigration flowing into this county and westward. I am unable to give a correct statement with regard to numbers, and it suffices to say that during the last five years, Bollinger county has increased in population at least one-third. There is not a vacant forty acre piece of good tillable land to be had in the county.

In conclusion, I will say that Bollinger county promises to excel any other in South-west Missouri in mineral wealth. What we need are men of energy and enterprise, possessed of the necessary means, to locate here and take our mines in hand, to develop the hidden wealth of Bollinger. This is what we most need, and will, undoubtedly, soon have.

CALLAWAY—H. LARIMORE.

The leading staples of Callaway county are wheat, corn, oats timothy, clover, tobacco, etc.

In importance, the commodities that are most exported rank as follows: 1. wheat; 2. corn; 3. oats.

The crops of 1871 averaged fully ten per cent. above an ordinary yield, except in hay, which was cut short by the prevailing drouth.

The estimated yield of wheat per acre, last year, was eighteen bushels; corn, thirty-five bushels; oats, forty-five bushels; rye, twelve bushels; tobacco, eight to twelve hundred pounds; Irish potatoes, one hundred bushels; sweet potatoes, one hundred and fifty bushels; castor beans, hemp, broom-corn, flax seed, buckwheat and white beans, not stated.

There is an increase in cattle, sheep and swine; none stated in horses and mules.

A railroad is now being built, and partly completed, running north and south through the county, and through Fulton, the county seat, and the Missouri River furnishes additional facilities of transportation.

Many immigrants are coming, and more are wanted. Callaway county wants all the sober, industrious working men, who are seeking homes; lands are cheap, and the soil is adapted to the cultivation of the grape.

Apples, pears, peaches, and all the small fruits that have been fairly tested, grow well. Thousands of acres of land, thought to be the best fruit land to be found, are now clothed with the natural forest, there not being enough people to occupy them.

REPORT OF THE CALLAWAY COUNTY AGRICULTURAL AND MECHANICAL SOCIETY.

FOR THE YEAR 1871.

The stock of the Society is owned by sixty members, owning one share each. The amount of money on hand is $3,043.

The real estate of the Society consists of about fifteen acres of land adjoining the city of Fulton, with very good Fair-ground improvements on it.

At the annual Fair, this year, there were only 214 premiums awarded, (out of 260 offered,) amounting to $2,443.

The whole number of entries was 560, as follows:

Entries.	No. of Entries.	No of Premiums.	Amount.
Domestic manufactures	100	40	$ 134 00
Dairy products	23	10	17 00
Vegetables and fruits	10	7	8 00
Grain and tobacco	25	11	21 00
Mechanical	7	6	26 00
Sheep	22	8	36 00
Hogs	21	10	95 00
Cattle	56	30	382 00
Horses	243	71	1,257 00
Mules	40	13	136 00
Jacks and jennets	11	7	81 00
Brass band	2	1	250 00
Total	560	214	$2,443 00

The following shows the census report for 1869, and estimates for the years 1870 and 1871:

	Census report, 1869.	Estimated 1870.	Estimated 1871.
Number of Horses	8,034	8,200	8,300
" Mules and asses	3,007	3,150	3,200
" Milch cows	6,434	7,000	7,500
" Working oxen	531	550	550
" Other cattle	11,782	12,000	12,500
" Sheep	31,115	32,000	32,000
" Swine	33,186	35,000	40,000
Value of all live stock	$1,655,935	$2,000,000	$2,000,000
Bushels of Spring wheat	209	200	200
" Winter wheat	155,504	175,000	165,000
" Rye	8,292	9,000	9,000
" Indian Corn	962,887	1,500,000	2,000,000
" Oats	389,883	400,000	450,000
" Barley	702	1,000	1,000
" Buckwheat	33	150	250
Pounds of Tobacco	913,078	1,200,000	1,250,000
Pounds of Wool	90,202	100,000	120,000
Bushels of Irish Potatoes	45,076	45,000	35,000
Bushels of Sweet Potatoes	2,103	3,000	5,250
Value of Orchard products	$32,899	$30,000	$35,000
Dairy products: Butter, lbs	210,737	500,000	575,000
Dairy products: Cheese, lbs	5,900	6,000	200
Dairy products: Milk, gallons sold	3,493	10,000	60,000
Tons of Hay	10,731	8,000	10,000
Pounds of Maple Sugar	7,662	8,000	8,500
Gallons of Molasses	11,039	10,000	9,500
Pounds of Beeswax	680	1,000	700
Pounds of Honey	22,731	40,000	25,000

The market varies with the St. Louis market, and is governed by it, less the transportation. The following list shows the minimum and maximum:

Spring Wheat, per bu	65c@ 90
Winter Wheat, per bu	85c@$1.25
Rye, per bu	75c@ 1.00
Indian Corn, per bu	25c@ 50
Oats, per bu	25c@ 35
Tobacco, per lb	3c@ 25
Wool, per lb	30c@ 65
Irish Potatoes, per bu	50c@ 1.25
Sweet Potatoes, per bu	60c@ 2.00
Butter, per lb	15c@ 35
Cheese, per lb	16c@ 25
Milk, per gal	10c@ 40
Apples, (green,) per bu	15c@ 1.00
Peaches, (green,) per bu	50c@ 1.50
Hay, per ton	$10.00@13.00
Maple Sugar, per lb	16c@ 25
Beeswax, per lb	25c@ 30
Honey, per lb	20c@ 30

The time of holding the annual meeting is the first Saturday in November.

The Directors elected, at their annual meeting this year, Charles A. Bailey, President; Isaac D. Snedecor, Secretary; Wm. H. Bailey, Treasurer.

The time of the Fair for 1872 commences on Tuesday, August 20th, and will continue five days.

CHAS. A. BAILEY,
President.

Attest:

ISAAC D. SNEDECOR, *Secretary.*

CAMDEN — JOHN W. ARMSTRONG.

Camden county is situated on both sides of the Osage River. It is bounded on the north by Morgan, on the the east by Miller and Pulaski, on the south by Laclede, and on the west by Dallas county. Camden county has every variety of soil, from the rich alluvial bottom lands to the poor "post oak flats." But this poor land is not destitute of productive qualities. Perhaps there is not a foot of land in Camden, clear enough of rocks to be plowed, but what will remunerate the cultivator, if he will only work. Our poorest land is not the poorest land in the world; neither is our rich land the best in the world. All our lands can be improved; and, without fertilizers, would produce more abundantly if we would cultivate it better. Our title deeds make no mention of the *depth* of our land, and in plowing we are excessively careful not to plow down through our own on to some one else's land.

Limestone is the rock we have in the greatest abundance. Not being a geologist, I shall not attempt to classify the rocks of this county; but will speak of them just as I understand them myself. There is an abundance of flint rock here; not often found in ledges, but generally in loose fragments, scattered promiscuously, and often so numerous as to completely hide the soil. Sandstone is abundant in some localities, but I know of no soil in Camden so intermixed with sand as to give it the character of sandy soil. Grindstone grit, although not generally diffused over the county, is yet quite abundant. I have seen three or four immense masses of grindstone grit, all completely above ground, and washed as clean by the rains as if some fastidious woman had scoured them. One of these masses, or piles, would furnish material enough for a million grindstones two feet in diameter. This was, and may be now, on government land. I got one stone from the place, and smoothed one side of it to whet axes with. I think I know good grit, when I try it, and I am sure I never saw better in my life.

The soil on these flinty hills and ridges is as fertile as most bottom lands, when relieved of its burden of flint. I know one individual who had courage enough to locate a homestead on one of these flinty ridges, and bravely went to work to open out a farm. The dirt could scarcely be seen; but, nothing daunted, he attacked it with pick, shovel and wheelbarrow, and in an incredibly short time he had as fine a field of corn, potatoes and beans as this or any other country could boast of. Certainly this man's energy was misapplied; for he could have secured other lands, without such incumbrances, at the same price. But such experiments are valuable, nevertheless; for in coming time, when the country is densely populated and lands are high, the knowledge of such facts will give a good heart to those who will be necessitated to improve these lands.

The principal streams in Camden county are Osage, Big and Little Niangua, Auglaize and Dry Glaze rivers. Several streams flow into these rivers: some are large creeks, others small branches. These bottoms are all very fertile, and yield good crops when properly cultivated.

This county is essentially a *hilly* country. Indeed, it may be said to be *mountainous*. Geographers locate it on the Ozark range of mountains. The hills on the Niangua are precipitous, and it is a difficult undertaking to attempt to get into the valley; and, when once in, to get out again. Were it not for this fact—the almost inaccessibility of the valleys—the Niangua country would be the leading portion of our county; for, beyond all question, the land in these valleys is the richest we have. In these bottoms I have seen the largest walnut and burr oak trees I ever met with. Springs are abundant throughout the whole course of these streams. Every little hollow tributary to them is blessed with one or more springs of pure, cold water. The large springs, that form the source of the two rivers, are said to be the largest in South-west Missouri. I have never seen them. Sheep and hogs would do well here, if guarded all the time. Wild-cats prey upon the pigs, and wolves upon the sheep, so that many of the people of the Nianguas have but one or two of each of these animals, and some have none. Cattle do well here; and if the farmers would turn their attention to the raising of this class of stock, they would make it pay handsomely. The Niangua valleys are cursed with chills. People can not expect to be exempted from them, unless they live on the adjoining high lands. But as these are generally so steep, the settlers generally prefer risking their lives in the bottoms, rather than to be so inconveniently situated from the tillable lands. Perhaps no portion of Missouri has such a dense growth of large, valuable timber, as the Niangua country. Black walnut, burr oak, linn, white oak, black oak, hickory, pecan, hackberry, sugar tree, maple, wild cherry and sycamore, and all of these of the very largest size, form the principal growth of these bottoms; and in many places the grape vines cover the trees. The undergrowth is pawpaw, sumach, spicewood, redbud, dogwood, leatherwood, etc.

Leaving the Niangua country, and traveling eastward, we find the country very broken and sparsely settled until we reach the Dry Glaze river. Several little valleys are met with in this region, all rich, and affording good though isolated homes for those who love extreme retirement. Linn creek is the principal of these valleys. It is a narrow bottom, bounded by lofty, precipitous limestone hills. At its mouth is situated the town of Linn Creek, the county seat of Camden county. This place, in bygone days, was a place of some note as a shipping point. The merchants of Linn Creek once supplied all South-west Missouri and North Arkansas with goods. But, as a commercial point, its greatness is gone, and it is fast becoming like the ancient cities of Babylon, Tyre, Nineveh, etc. The Atlantic

and Pacific Railroad has killed Linn Creek. The Osage River is navigable a portion of the year, and Linn Creek still receives her supplies by river, and ships off a good portion of the produce of the county.

The Dry Glaze river, although not so mountainous as the Niangua, is yet quite rough. This river heads in Laclede county, not far from Lebanon, and the Laclede portion of it is superior to the Camden portion — not that the valleys are more fertile, but that it is not so hilly. The Dry Glaze is settled up with many very enterprising farmers, and a few shiftless, improvident ones, who are a curse to any country. This section of country is not very well watered. The river goes dry in the summer time — hence the name, Dry Glaze. There are some few excellent springs of water, however, on the stream, and for stock water, there are most generally some few holes of water left, that stock are compelled to drink. Benton Prairie is included in the Dry Glaze region. This prairie is the home of several enterprising farmers. Part of the prairie is in Laclede county. Decaturville, in Camden county, is situated on this prairie. This is a small village, containing one store, one blacksmith-shop, and three or four residences, for farmers, whose farms adjoin the village. There is a school-house here, which also answers for a place of worship, political meetings, and for jugglers to "show" in of nights. There is also a postoffice here. Decaturville came very near having greatness thrust upon it a few years ago. Some gentlemen in the vicinity thought they had discovered copper mines there. Specimens of the mineral (?) were freely distributed throughout the country. Decaturville began to put on airs. She began to paint and fix up. She imagined herself to be well copper-bottomed. People began to plant large cabbage patches, for the benefit of the innumerable immigrants that were expected to be there shortly. But all at once the copper mania ceased. It was discovered that some wag was in the habit of driving pieces of copper plate in the crevices of the rocks, where it would be sure to be seen; and if there really had been copper there, the knowledge of this fact would have bluffed any one but a practical mineralogist.

The Dry Glaze empties into the Auglaize River. The country between the Dry Glaze and Auglaize is diversified with uplands and valleys. Some of the uplands are very productive; but it is in this region where the "post-oak flats" exist in all their glory. The time has been when people here considered the post-oak flats only as an incumbrance to the country; but of late they are beginning to be settled up, and the industrious man is sure to make a good living there.

Buffalo Prairie is between the Dry Glaze and the Auglaize. It is tolerably thickly settled. Some of the farmers are making money, while others are going down hill all the time. An enterprising gentleman living near this prairie buys up all the straw, stable manure,

chicken manure, etc., etc., from some of his neighbors, and fertilizes his own land with it. He usually gets such fertilizers for a tune, and whistles the tune. There can be no doubt but that he does perfectly right, for the fellows would burn up and destroy the materials, doing no good to anybody. He is getting rich, and they are getting poor.

We now come to the Auglaize country, commonly but erroneously called the Wet Glaze country. I believe I am safe in saying that there are more fertile valleys and "hollows," tributary to the Auglaize river, than any other stream of similar length in South-west Missouri. The ridges separating the valleys are very narrow, often not so wide as the valleys. It has been thought by many people who have observed this region closely, that there are more acres of valley land than of upland, from a few miles above the mouth of the Dry Glaze to the head of the Auglaize valley. There is a ridge running east and west, which separates the Auglaize from Bear creek. This latter stream is in Laclede county, and flows eastward into the Gasconade river. The ridge is the boundary line between Camden and Laclede. On this ridge is the Atlantic and Pacific Railroad. At this ridge some fifteen or twenty valleys—most of them large enough for farming purposes—set in, and although they have water in them only when it rains, yet the settlers manage to have a supply of that element on hand in sufficient quantities. Richland, (in Pulaski county,) and Stoutland, (one half in Laclede and the other in Camden county,) both situated on the railroad, boast of being at the head of the Auglaize valley. Both are correct, although they are twelve miles apart

Coming down the valleys from Richland, we first find water—living spring water—at Mr. Samuel Traw's, four miles from Richland. Then one mile below, on Light's creek, we meet with some large springs on the farm of Simeon Traw. This creek enters into the Auglaze River four or five miles below.

Making our starting point from Stoutland, in five miles we find two very large springs, which are the head waters of the Auglaize River. Two mills, in days agone, were on this stream, a few hundred yards from the springs. One of them "gave up the ghost" years ago, in consequence of the owner being a gentlemen who was born "tired," and never did get well rested. The other mill was accused of taking sides with the South in the "late unpleasantness," and was torn down by the loyalists, "to save the Union."

Two miles and a half north-west from these springs are three others. This is the head of the Wet Glaze. Two mills are in operation here. The Wet Glaze empties into the Auglaize about six miles from its source, two miles above Glaze City.

This village is situated on the east bank of the Auglaize, and is in the the most favorable situation for a local business place, of any other in Camden county. The best farming land of Camden county, taking into account accessibility, etc., is around Glaze City. To the transient observer it would look like a very wild and mountainous

region. Several rich valleys empty into the Auglaize near Glaze City, and others are separated only by narrow ridges. Three or four springs of the purest and best of water are in this village.

The head of the Auglaize is a miserably poor timbered country. But from the junction of the Wet Glaze and Auglaize, down to the Osage River, it is inferior only to Niangua in good valuable timber.

The valley of the Osage River does not differ a great deal from the other river valleys of this county in point of fertility. It is a very rough country.

Camden county, north of the Osage River, is as yet the almost undisputed home of the panther, the wolf and the wild-cat. There is not much tillable land here, and but a few settlers. It is a portion of little importance.

A great deal has been said about the large springs in Camden county. Perhaps a few words more may not be out of place.

I do not know that any chemical analysis has ever been made of these waters. But, judging from the taste and temperature, they are all identical. This country is full of caves. The earth almost resembles a honey comb in its structure. In these caves we frequently meet with pools, and sometimes with large bodies of water, appearing to be perfectly still and quiet.

On the farm of Mr. Tal. Vernon, there is a remarkable lake of this kind, a portion of which is exposed to daylight. You descend down a large circular hole in the top of a hill. Forty feet below you come to an overhanging arch of limestone, and under this stone is a vast subterranean lake of water, whose extent and depth is unknown. One feels awe-stricken while standing upon the beach of that lake, whose silent waters repose in mute but expressive grandeur in awful and impenetrable darkness. Generally but a small portion of the water is visible. Impenetrable darkness seems to be its only boundary. No vessel, bearing human life, has ever floated far on that lake. Sometimes the water rises until it almost touches the overarching rocks; at other times it is forty feet below.

On the west bank of the Auglaize River is another cave, in which is another lake; but unlike the one on Mr. Vernon's farm, it overflows during high water. But when the water is below the point where it sometimes overflows, it seems to be as tranquil as the other. Several similar subterranean lakes are known to exist in this country. There are several springs in different parts of the county, on the same level with each other, that all flow at the same time and all become dry at the same time. Take all these facts into consideration, and it is highly probable that all these underground lakes are connected with each other, and the whole form a vast subterranean fresh water ocean—an inexhaustible reservoir for the large springs that form a distinctive feature of the Ozark range of mountains. If this be true, (and certainly it is, at least probably,) this is the grandest system of under-drainage in the world. And indeed,

whatever may be necessary in other lands, to secure a proper drainage of the soil, no such necessity exists here, except in a few localities. When rains fall here, the land is soon dry enough to work, and the friable nature of the soil, its depth, and its readiness at almost all times to be worked, indicates that it is well under-drained. I happen to know but little about the science of geology, and it would please me very well for some person well versed in the science (as for instance, Prof. G. C. Swallow,) to investigate this country, and let us know whether or not this conjecture be correct.

The leading agricultural staples of this county are, corn, wheat and oats. More wheat is exported than anything else; next to it is oats. We export but little corn; most of our corn is fed to stock, and in that shape is exported.

In some portions of this county the crops are a great deal better than they were last year, and in others they are greatly inferior. Taken upon the whole, the aggregate amount of farm products for the whole county differs but little from previous years. During the spring months, we had a profusion of rain. Immediately after the corn was planted, it began to rain, and there was but little time to work between the rains. The weeds then got a fair start, and they maintained the supremacy throughout the season. A great deal of corn was blown down, and the plow had to be stopped. As the hoe requires some expenditure of what we back woodsmen call "elbow grease," it was not much used. Also, most farmers put in too much wheat and oats; and as the harvest was earlier this year than usual, and laborers scarce, farmers had to neglect their corn to take care of their small grain.

The Hessian fly injured the wheat this year, and cut the crop short. Oats did well; the common black oat, the Norway oat, and the Surprise oat were the varieties sown. The Norway oat is decidedly the best; but the cock-and-bull stories put forth by Ramsdell & Co., about their immense yield, are simply unrealized in this county. The Surprise oat is a complete humbug — an incomparable nuisance. A certain party in Lebanon sold these oats at two dollars per bushel, and declared them to be no "Ramsdell-Norway oat humbug." He was correct; for certainly it was a far greater humbug. Just about the time the Surprise oats begin to get ready to be harvested, they all fall down, and resemble an oat-field that a drove of hogs had been turned in.

The average yield of produce in this county may be tabulated as follows:

Corn, on bottom-lands	per acre	40 bu.		On uplands	per acre,	20 bu.	
Wheat,	"	15	"	"	"	8	"
Oats—Black,	"	25	"	"	"	15	"
" Surp'se,	"	20	"	"	"	10	"
" Norw'y,	"	40	"	"	"	25	"
Buckwheat,	"	40	"	"	"	30	"
Potatoes, Irish	"	100	"	"	"	80	"

Sweet potatoes, cabbages, onions, beans, peas, beets, tomatoes, etc., are only raised in gardens for domestic use. Rye and barley are cultivated to a limited extent. Clover, timothy, orchard-grass, etc., although not extensively cultivated, are yet cultivated in sufficient quantities to establish the fact that they will do as well here as elsewhere. Flax is sometimes raised for home use. I do not know of any instance where hemp has ever been tried. Hops are a spontaneous production here; they grow wild in the woods, and I should think their cultivation here would be extremely easy, and very remunerative. [N. B.—Hops grown so far south as Camden county will not sell to the brewers.—ED.]

There is an increase, over last year, in cattle, horses and hogs; but I have no means of knowing how much they have increased. Sheep, if they have not *decreased*, have remained on a dead stand-still. No country is better adapted to sheep-raising than this; but the sheep must be guarded from wolves and dogs, or sheep-raising will be a failure. Mr. Silas Overturf, an enterprising farmer of Buffalo Prairie, has began the breeding and raising of sheep as a specialty. He has introduced the Cotswold breed into the county.

Our hogs are *thoroughbred scrubs*, real "bristle-backs," with a considerable stain of "razor-back" blood. It is utterly impossible for any one to keep up a stock of pure-blood hogs in this county. Very frequently a fine Chester or Berkshire sow has pigs by a worthless scrub boar, that has the reputation here of being a hog. Unless a stock-law is made, that state of things will continue for an indefinite period. Unfortunately, however, if this county is allowed to say whether she will have a stock-law or not, the law will be defeated by an overwhelming majority.

Lebanon, (thirty miles from Linn Creek, our present, but not prospective county seat,) is the nearest point on the railroad to our county seat. The Atlantic and Pacific Railroad runs on the county line of Camden and Laclede. Beside this railroad, we have the Osage River for transportation; but it is navigable for only a portion of the year, and does not compete a great deal with the railroad.

In regard to immigration into the county—*some* people have moved in. I can not tell how many. Many of these immigrants are valuable acquisitions to the county, while others are a less desirable class. To such, we say, stay away. But to the worthy individual, who will strive to develop the resources of the county, we say, "come, you are welcome here."

Fruit, so far as it has been tried, does well here. Some few gentlemen have orchards of apple, peach, pear and cherry trees. This branch of industry has as yet assumed no great importance. I know of no vineyard in the county, and none starting. A few vines, here and there, planted out as much for ornament as use, nowhere pruned or otherwise properly cared for; but, notwithstanding the neglect,

the yield of large, handsome and abundant clusters proves that this county is well adapted to vine-culture.

The mineral resources of the county are as yet undeveloped. Indications of mineral are said to be met with often, and one company at Linn Creek has begun digging for lead ore. Those who profess to know the "signs," say that there is mineral here, of iron, lead, etc., in fair quantities.

Some fellows have put forth some marvelous reports about the fertility of this country. Such stories are an injury to us. Men of character do not wish to be humbugged, and will not settle among us when they find they have been imposed upon.

We have no agricultural society here, and no prospect, at present, for any. Perhaps, after a while, people will begin to see the importance of these things, and when this, with other means, causes us to be more of a scientific community of farmers, then, and not till then, will Camden cease to lag behind.

CAPE GIRARDEAU—Hon. Linus Sanford.

The leading agricultural staples of this county are wheat, corn and tobacco. We export more wheat than any other product, and next in importance is corn, and then tobacco.

Our wheat crop is not as good as that of last year, and is not an average crop. The quality is good, but the yield is not as good as it might be. It ordinarily averages about twelve bushels to the acre, but this year it did not exceed eight bushels to the acre.

Corn will usually produce forty bushels to the acre. This year I do not think it will exceed twenty-five or even twenty bushels.

The tobacco crop is good. Owing to the severe drouth, the Irish potato crop is almost a failure. The sweet potatoes, however yielded well, and were of a good quality.

The stock of horses, mules and cattle has increased rapidly in the last few years. The people in this county are, perhaps, giving more attention to any other stock than cattle.

White Water Station, on the St. Louis and Iron Mountain Railroad, is the nearest point on the railroad.

Our facilities for transportation are the very best. The Mississippi River washes the eastern boundary of the county, and the St. Louis and Iron Mountain Road, extending to Columbus, passes through the western part of the county.

Our produce is shipped to St. Louis, Memphis and New Orleans—our position being such that we can always reach either one of those markets.

I regret to say that we have not received the accessions to our population from immigration that is desired. Our position is, I think, a desirable one, and has been overlooked for a long time. I will not, however, add anything on this subject.

Within the last five years a great many orchards have been set out, and also several vineyards; of the latter we have several large ones here, which are doing well. No attention was paid to the grape until seven or eight years ago.

All kinds of fruit succeed well. We had fewer apples than usual, but had an abundance of all other fruits.

I will be glad to give any information or assistance in my possession at any time.

(BY HENRY BRUIHL.)

1. The leading agricultural staples of Cape Girardeau county are wheat, barley, oats, corn, hay, and, to some extent, fruit.

2. Wheat and flower shipped most; barley, second; corn, third.

3. Wheat crop about one-fourth of last year's crop; barley, one-fourth better in the northern half of the county; in southern half nearly the same as in 1870. Corn, one-fourth less in quality than in 1870; oats, about the same, owing to late frost, drouth, chinch bugs and rust.

4. The estimated average yield of wheat is about twelve bushels; corn, forty; barley, thirty-three; oats, thirty-three; rye, ten bushels per acre. I think tobacco yields from six to eight hundred pounds; Irish potatoes, about one hundred bushels; sweet potatoes, two hundred bushels; buckwheat, twenty bushels; white beans, five bushels; hay, one-and-a-half tons; and clover, one ton.

5. No increase in horses perceptible, nor in cattle, sheep or mules; increase in hogs, about fifteen per cent.

6. The Iron Mountain Railroad passes through the south-west part of this county.

7. The Mississippi River affords additional facilities for transportation.

8. But few immigrants come to this county at present. Large orchards are being planted; apple and peach trees do very well.

CAPE GIRARDEAU, Mo.,
October 30, 1871.

To the Corresponding Secretary of the State Board of Agriculture:

I take the liberty of giving you a report from the South-eastern District Agricultural Society of the State of Missouri, notwithstanding our Society has never been called upon to make a report by your board, but as we belong to the State, we have thought it would be acceptable, and consequently shall give it, for better or worse.

The south-eastern district comprises all the counties in this (Third) Congressional District, amounting in all to twenty-three counties. This Society was incorporated in 1855 by an act of the Legislature, and organized the same year, and held five successful fairs prior to the war, the last being held in 1860. The war coming on, our ground and buildings were occupied by United States troops; the consequence being the total destruction of our grounds and improvements.

The Legislature, in 1870, passed an act reviving our charter, and during the same year an organization was effected, and we set to work to prepare for a fair in the year 1871, which we called the Sixth Annual Fair of our Society. We have purchased twenty-three acres of ground about one mile and a half west of this city, which is about one-half paid for, and we have improvements as follows:

A section of amphitheater, 124 feet long, on the the style of the old amphitheater of St. Louis fair, capable of seating about 1,200 persons.
An arena 660 feet in circumference, as fine as any in the State.
Handsome pagoda in center of arena.
Floral hall, 35x85. (too small.)
Agricultural shed, 35x100.
Twenty-four hog pens, (covered.)
Twenty-five sheep pens.
One hundred and twenty-five stalls for cattle and horses.
Ladies' cottage.
Two cisterns.
One Downs' sand pump, carrying water in abundance sixty-three feet.
A set of skeleton seats without cover, capable of seating about 600 persons.
Secretary's office.
Handsome poultry pens.
A close board fence seven and a half feet high, incloses the whole tract.
A feed house to hold all sorts of forage for stock on the grounds.
A race or speed tract, elliptical shaped, one-half mile in circumference, in fine condition, besides many other small improvements, the whole costing us about $9,000.

With these improvements our fair was held on the 12th, 13th and 14th days of October, 1871, which resulted in a complete and surprising success, by giving universal satisfaction to the exhibitors and visitors, and satisfaction pecuniarily to the Society.

We offered about $1,400 in premiums.

Paid out cash premiums	$741 00	
Silver plate	195 00	
Agricultural paper	5 35	
Total paid for premiums	$941 35	
(The agricultural paper given as premium being the Illustrated Journal of Agriculture, published in St. Louis.)		
We charged no entry fees for premiums; our proceeds from gate fees; rent of stalls for stock; rent of booths; rent of restaurant stands and other stands		3,100 00
The number of stockholders are 207, 223 shares paid up, $20 each share.		4,460 00
Eighty-four shares, not paid, but due	1,680 00	
Additional stock taken since the fair, not yet due, 100 shares	2,000 00	
Total	3,680 00	7,560 00
Amount paid out	5,803 00	
Balance cash on hand	1,757 00	
		7,560 00
Total indebtedness	3,300 00	
Cash on hand	1,757 00	
Stock not yet paid	3,680 00	
		5,437 00

The above figures are approximate, as we are unable to get all accounts up in time, but our financial condition will not vary one hundred dollars either way.

We propose to increase our stock some five or six thousand dollars more, with which we will improve and beautify our grounds, improve our race track, build one or two additional sections to our amphitheater.

An addition to our floral hall, which we found to be too small by one-half.

Two hundred more stalls for cattle and horses.

A cottage for a tenant to live in during the year to have supervision of the grounds and improvements, and we will continue the improvements from year to year until we will have a fair ground equal to any in the State, outside of St. Louis.

The attendance at our recent fair was large, ranging from 4,000 to 6,000 each day.

The display of horses, cattle, sheep and hogs was exceedingly fine; the specimens of blooded stock would have been an honor to any fair in the State.

The Floral Hall was filled to overflowing with every description of ladies' manufature—consisting of quilts, blankets, ornamental needle-work, plain needle-work, ladies' dresses, various kinds of embroidery, carpets, jeans, linsey, baskets, boquets, butter, cheese, preserves, jellies, bread and cakes; of the fine arts, paintings in oil and water-colors, drawings—crayon and pencil—etc., and in fact numerous articles for which no premiums were offered, but of which we make honorable mention in our published report.

Of fruits, vegetables, etc., there was a fine exhibition. Although our fair was almost too late in the season for this department, still the display was a very creditable one. The numerous entries of wines, cordials, liquors, etc., were of a superior order; and our wines manufactured in this district will successfully enter the ring with those of Hermann and other parts of the State. We invite competition from other sections in this class.

A large lot and great variety of improved agricultural implements, by different makers and inventors, were on exhibition. The grounds were large for their trial, and the farmers interested in the contest by the exhibitors.

In the mineralogical department a display worthy of the great mineral interests of Missouri was made—consisting of ores of lead, iron, tin, nickel, copper, etc., as well as the various clays from which are made a great variety of paints—building stone of various kinds, some of which rank with the best used in the State—white, black and variegated marble, kaolin; besides many mineralogical and geological curiosities found in this section of the State.

Many articles of interest, of new invention, were on exhibition; among the most worthy and important were:

One for the manufacture of wheels and hubs for carriages and wagons, by James O'Connor, of Cape Girardeau county;

A tire cooler, made and invented by Edward Stodtmeister, of this city;

A knitting machine, made and invented by Madison Williams, of Scott county.

The officers for the present year are as follows:

PRESIDENT.

Manning M. Kimmel.

SECRETARY.

George W. Travis.

TREASURER.

William V. Leech.

DIRECTORS:

William C. Ranney,
Henry Bruihl,
George G. Kimmel,
William Cross,
Herman Bader,
George Seimers,
Leman Hale.

The above board and officers were elected in August, 1871, and without a dollar in money or property to begin with, have, by the aid of the friends of agricultural and mechanical enterprises of this sort, accomplished what has been above stated.

In the year —— an act was passed incorporating our society, and in said act an appropriation was made donating us $1000 for that year and $500 for four consecutive years thereafter; but for some reason the money was not drawn from the State, and upon application some months ago, by the present President of this Society, the Auditor of the State informs us that only $100 has been drawn, prior to 1860 and to the present date, but that the balance can not be obtained until an appropriation shall be made again for that purpose. We hope the Legislature will do us the justice to grant this to us during the coming session this winter. Our section of the State is not often a supplicant for favors from the State, and in justice we now ask them to grant that which was donated to us years ago, but withheld until the present time. We respectfully ask the Board of Agriculture to assist us, if possible, in this matter.

[Mr. Louis Houck, of Cape Girardeau, delivered the regular annual address, which was able, instructive, and full of practical ideas.]

Our election for new officers takes place on the first Saturday in December of each year.

Respectfully submitted:

MANNING M. KIMMEL,
President.

CARROLL—Hon. James S. Logan.

The leading staple of Carroll county is wheat.

The commodities most exported rank in point of importance as follows: 1st, Wheat; 2nd, corn; 3rd, tobacco.

The crop of 1871 compares favorably with that of 1870.

CASS—Alfred C. Loveridge.

Cass county stands without a rival in everything that goes to make up a first-class agricultural county. Situated in the extreme western part of the State, on the border of Kansas, and at equal dis-

tances from the Missouri and Osage Rivers, having no lakes nor swamps, the location is healthy. For richness of soil, it is not surpassed in Missouri. The soil consists, mostly, of a black, loose loam. The surface of the county is chiefly high, rolling prairie. There is rather a limited supply of timber, but enough for farming purposes, the farmers having planted hedges extensively. Living water is not very abundant, but sufficient can be obtained by digging for all purposes, and water is usually found near the surface.

Our county is being rapidly filled up by immigrants, mostly from the Northern and Eastern States. Energy and enterprise are the characteristics of her people. Improvements, both public and private, of a modern character, and of every kind and class, are being rapidly pushed forward. Our school system, under the management of our present efficient superintendent, J. T. Weathers, Esq, has been thoroughly renovated and reorganized. The different schools, as far as practicable, under the new order of things, have been placed under the control of competent instructors, and are doing good work for the rising generation.

Pleasant Hill, a city of 2,300 inhabitants, situated in the northern part of the county, on the Missouri Pacific Railroad, 250 miles west of St. Louis, is the largest town in the county, and is at present rapidly improving; it is the eastern terminus of the Pleasant Hill and Lawrence Railroad; the Lexington, Lake and Gulf Railroad also crosses the Missouri Pacific here, and is already graded through the county from north to south.

Harrisonville, our county seat, has a population of about 1,500, and is rapidly improving since the construction of the Osage Division of the Missouri, Kansas and Texas Railway, which runs through the town. This road has its eastern terminus at Holden, on the Missouri Pacific Railroad, and is now completed, and the trains running regularly, to Paola, Kansas, giving us direct intercourse, by way of the Missouri Pacific, with St. Louis, and by way of the Kansas City, Fort Scott and Gulf Railroad, with Kansas City and its whole system of railroads.

The Kansas City and Memphis Railroad is located through the county, from north-west to south-east, running through the county seat, and a large force is at work constructing the road-bed. It is expected that all the above railroads will be completed by the first of September next. The county will then have about 120 miles of railroad in operation.

Unimproved lands rate at from eight to fifteen dollars per acre; the value being estimated according to location and quality.

Every person contemplating a removal West, should by all means pay Cass county a visit before locating. Now is the time for immigrants and business men, who are looking for locations, to come just as the iron horse is bringing the country into notice, and grasp the many opportunities that are presenting themselves to the eye of

industry and enterprise. We want three times our present population to develop fully the resources of the county. To all those wanting lands that will raise all the different varieties of grain and fruit to perfection, and that will not wear out, I would say, now is the time to purchase everlasting homes, that can be made equal to the sunny lands of Italy.

There are four newspapers published in the county, all issued weekly, viz: the "Harrisonville Democrat" and "Cass County Courier," published at Harrisonville, and the "Review" and "Leader," at Pleasant Hill.

Four years ago the Cass County Agricultural and Mechanical Association was organized, and has since held four fairs, each of which has been a complete success, except financially.

The chief productions of the county are corn, wheat, oats, rye, sorghum, sweet and Irish potatoes, horses, mules, neat cattle and hogs.

Corn is the staple grain; the average yield to the acre, this year, will, I think, exceed fifty bushels. The crop of the county will exceed three millions of bushels. To the traveler, the county looks like one vast corn-field.

Wheat yields from twelve to thirty-five bushels. The early May is mostly cultivated; the white and red Mediterranean varieties are coming into favorable notice among our farmers. They seem to stand the winters better, and are less liable to the ravages of insects, than most other varieties. Mr. Jacob Hyde, of Grand River township, last fall sub-soiled thirty acres to the depth of fifteen inches, drilled 1½ bushels to the acre, of the red Mediterranean wheat, finished sowing the 28th of October, 1870, and this fall harvested and threshed 1,050 bushels, or thirty-five bushels to the acre, while the average crop of his neighbors did not much exceed twenty bushels. This is the only piece of land sub-soiled for crops, to my knowledge, in the county, and should, it seems to me, offer a strong argument in favor of a more thorough cultivation.

Oats are cultivated to some extent; the average yield is about forty bushels per acre.

Rye succeeds fairly; averaging about twenty bushels per acre.

Barley is not cultivated to any extent, owing to the ravages of the chinch bug.

The average yield of buckwheat is about twenty-five bushels. Not very extensively raised.

Tobacco is not much cultivated.

Sweet potatoes are grown for home consumption, and to supply local demand, and succeed admirably.

Irish potatoes do well—averaging about 125 bushels—and do not seem to impoverish the soil more than corn.

Sorghum is raised in a small way, for home consumption, and to supply local demand.

Cotton, broom-corn, castor beans, flax, white beans and hemp are not grown to any extent in this county, but have succeeded well wherever an attempt has been made to raise them.

The fruits principally cultivated are, the appple, peach, pear, plum, cherry and grape. All yielded abundantly this year. The small fruits have succeeded well as far as they have been tried; but as yet the business is in its infancy. Fruits of all kinds are being planted quite extensively, and in a few years fruit-growing will become one of the leading industries of the county, as our soil is among the richest in the world, and our climate seems peculiarly adapted to the development of all kinds of fruits to their greatest perfection.

This year's crop of grain and fruit is about an average of former years, except the crop of corn, which is much in excess.

There is a marked increase in the number and quality of all kinds of live-stock, including cattle, horses, mules and swine, and most of the corn crop is fed out to them, and our farmers are turning their attention particularly to feeding cattle and hogs, which, after being fattened, are mostly shipped to St. Louis.

St. Louis is our principal market for all kinds of produce, and our merchants purchase most of their goods there, though Kansas City is now bidding largely for the trade of this section, with some hopes of success.

CEDAR—James A. Cogle.

1. The leading agricultural staples are corn, wheat, oats, and sweet and Irish potatoes.

2. Wheat is the only commodity exported.

3. The crop of 1871 is twenty per cent. better than for ten years last past, except Irish potatoes, which fall short.

4. The average yield of wheat per acre is estimated at fifteen bushels; oats, thirty bushels; and corn, forty bushels.

5. The increase of horses, mules, cattle and pigs, is about twenty per cent.; sheep, on the other hand, show a decrease of five per cent., caused by the ravages of dogs, which induced many farmers to dispose of their sheep.

6. The nearest point to a railroad is a station on the Missouri, Kansas and Texas Railroad.

No other facilities for transportation, except ox and horse teams.

Nevada City is the western market for our produce. No reliable data can be given regarding immigration. Our county receives an average amount of the immigration which finds its way to the great West.

Our Agricultural Society is yet in its infancy, but is firmly established. It is indebted to some extent, but is supported by many of our best citizens, and with favorable weather during our annual fair we think we can show a fair exhibit.

CHARITON—Hon. Lucius Salisbury.

Your circular of August 7th is at hand.

In reply I will give as correct answers as I can.

1. The leading agricultural staples of this county are: tobacco, wheat, corn, rye and oats.

2. We export most: tobacco, wheat and corn.

3. Our crops of 1871 are the best we have raised for several years.

4. The average yield of wheat per acre is about twenty-five bushels; corn, forty-five to fifty bushels. Oats this year are nearly a failure, owing to a long dry spell soon after they were sown. The average of oats generally is about forty bushels per acre; tobacco averages about 1,000 pounds per acre.

5. There is an increase of cattle, horses, mules and swine. This county is well adapted to stock raising, and will soon be one of the leading counties in Missouri in that line.

6. Chariton county is, or will be, well supplied with shipping facilities: *First*, It has the Missouri River on the south. *Second*, The west branch of the North Missouri Railroad passes through the entire county, from east to west. *Third*, The Brunswick and Chillicothe Railroad passes through the west side of the county. *Fourth*, The Missouri and Mississippi Railroad (now being built) will pass through the east side of the county. By the side of this last-named railroad we have some of the finest coal fields in the West. The coal banks are from four feet to seven feet three inches thick, and the coal is of an excellent quality. *Fifth*, The Hannibal and St. Joseph Railroad is but a few miles north, and passes from east to west through the State.

7. The foregoing includes our facilities for transportation.

8. Our markets for our produce are, St. Louis, the Southern States, Eastern States and Europe.

Within the last ten years this county has nearly doubled in population. The last enumeration gives us about 20,000 inhabitants.

This county is very large, well watered and timbered, and has the best of rich, deep, and gently undulating soil, capable of producing fine crops suited to our climate.

Our fruit crop is sure, and of the best quality.

In my opinion, but few counties in the United States excel this county for agricultural and stock purposes. Our pasturage is equal

to the famous "blue-grass region" of Kentucky, and equal to any under the jurisdiction of the "stars and stripes" for timothy or clover, and, withal, as healthy.

Considering the quality of our soil, location, and means of transportation, and cash value of our land, we can offer great inducements to good farmers in quest of homes.

CLAY—Hon. Henry Smith.

In reply to your queries, I would state:

1. The leading agricultural staples of this county are corn, wheat, hemp, oats, rye and fruits.

2. We export most, wheat; next, hemp; next, rye; next, oats.

3. Our crop of agricultural staples for 1870 was an average all around. For 1871, corn is twenty per cent. over average; wheat is five per cent. over average; hemp, average; oats and rye, ten per cent. over average. Fruits, such as apples, peaches, etc., 100 per cent. over average.

4. The average yield per acre, of wheat, is eighteen bushels; corn, forty bushels; oats, forty bushels; rye, thirty bushels; barley, thirty-five bushels; potatoes, (Irish,) seventy-five bushels; hemp, 900 pounds.

5. The increase in cattle is twelve per cent.; horses, twenty-five per cent.; swine, 100 per cent. The decrease in mules is ten per cent.; in sheep, 100 per cent.

6. The Kansas City and Cameron Branch of the Hannibal and St. Joseph Railroad runs through Liberty, the county seat.

7. The North Missouri Railroad, the Kansas City, St. Joseph and Council Bluffs Railroad, the St. Joseph and Richmond Railroad, and Hannibal and St. Joseph Railroad, run through this county, making about sixty miles of railroad in the county, with a dozen depots. The Missouri River bounds the south side of the county for a distance of thirty-five miles.

8. Kansas City is our nearest produce market.

But little immigration to the county.

This is strictly an agricultural county; having no mineral wealth but a few thin layers of poor coal. Vines and fruits do well here, and the people are fast turning their attention that way—the increase of apples, peaches and pears this year, being 100 per cent. over average. Much attention is bestowed upon bees, the increase this year being twenty-five per cent.

I deem the above as accurate, having consulted the county assessor and several farmers.

CLINTON—JOHN L. CLARK.

Our leading agricultural staples are corn, wheat and oats.

Wheat is most exported, next oats, and lastly corn—the latter being mostly fed out to stock.

The corn crop of this year was larger than 1870, but not as good in quality; wheat equal in quantity, and better in quality; oats very poor, compared with last year's crop.

I estimate the average yield of wheat at about 12½ bushels per acre; corn, 25; oats, 15. Irish potatoes, a good crop; sweet potatoes, do.; buckwheat, a light crop. Other crops not of sufficient importance to deserve mention.

No increase in cattle; a little in horses and mules; a decrease in sheep, and a marked increase in swine.

The St. Louis and St. Joseph and Chicago and South-western Railroads (completed) cross at Plattsburg, the county seat. The Hannibal and St. Joseph Railroad crosses the northern edge, and the Kansas City and Cameron Railroad runs through the eastern side of the county.

Our western market is Chicago.

The immigration to this county is not considerable at the present time; for three years it has been good. Clinton county is pretty well settled, generally by a good class of citizens. But little real-estate changing hands. Improved lands are worth from twenty to forty dollars per acre; unimproved, ten to twenty.

The apple crop was good; in fact, all fruits were abundant in their season.

COLE COUNTY.

REPORT OF NINTH ANNUAL COUNTY FAIR.

Secretary Missouri State Board of Agriculture:

By your request, I propose to give you some data of the doings and results of our last county fair.

This was our ninth annual meeting. This was the only county in the State, (not excepting St. Louis,) that held a fair during the war, and had it not been for the fact that Shelby came within thirty miles of our place during our fair, and created a stampede, we would have had as creditable a fair then as we had previously or subsequently; but the stampede caused a financial loss of $100.

The meeting this fall was well attended, and the display of stock, fruits, vegetables and grain, was very creditable to any county. Cal-

laway, Boone and adjoining counties, patronize us very liberally with their stock. Among the cattle were the renowned herds of Henry Larimore, of Callaway county. He exhibited three as finely proportioned and well developed herds as can be found in the West; they did not have the age, nor quite the size that some other herds that I have seen may have had, but for symmetry, beauty and *squareness*, (a word of my own in this connection,) they could not be excelled.

A very noticeable feature in this fall's fair was the large and varied display of swine. At our first fair we had no hogs on exhibition, and when they first made their appearance, there was, I think, but one; but each successive fair they have been increased, until last fall, when there was on exhibition over eighty head, representing some seven different breeds and several crosses. The prospects are that hereafter the hog department will excite a good deal of competition.

The fruit department was well represented; several persons having as many as forty different varieties of apples, among them, some of the most approved sorts. Others had fifteen varieties of peaches.

There was one very noticeable feature, not much to our credit: that was the lack of display of agricultural implements, there not being one half as many as we had on former occasions; but hereafter we may expect quite a lively competition, as we have in our town an establishment for the manufacture of agricultural implements; and this being the only establishment of the kind west of the Mississippi River, it will not be inappropriate to give a description of the works.

The firm of Bodine, Hill & Co., commenced in 1871, and have an establishment fronting 120 feet by 198 deep, upon which they have erected a substantial two-story manufactory, equipped with all the modern machinery, and sufficient to work 100 men. The proprietors were anxious to manufacture the best machines now used by the most intelligent and practical farmers, and, after scanning the whole field, and consulting a number of experienced agriculturists, came to the conclusion, taking all things into consideration, that the Hubbard was *the* machine, it having taken the highest prize, (a gold medal,) at the two National trials, one at Auburn, N. Y., and the other at Mansfield, Ohio, as a combined reaper and mower; besides having carried off a host of smaller premiums when brought in competition with other machines. From their experience with last year's sales, they have made arrangements to turn out 1,000 machines, to be ready for the harvest of 1872, (see cut of machine.) As an encouragement to persons desirous of engaging in manufacturing, I can readily say, from conversation with Messrs. Bodine, Hill & Co., that materials are much cheaper, and labor as cheap and as plentiful here as anywhere in the East; besides the saving of enormous freights for transportation, and also the great advantage a farmer would have in getting any part of a machine, that would, by accident, give way in the midst of his harvest.

The premiums offered by our last fair amounted to $2,000, besides about $200 offered by some of our liberal-minded citizens.

The company expended over $1,200 on improvements this year. They extended the grounds some four and a half acres, so as to include a grove of small trees—the fine forest trees that were in our grounds previous to the war, having been cut down by the soldiers. In a few years, by care, we will have a handsome grove on a beautiful knoll overlooking the whole surrounding country.

The original cost of our grounds was $1,200; that is, forty acres at $30 per acre. We inclosed an area of some ten or twelve acres, and erected an amphitheater three hundred and twenty feet in diameter. The amphitheater will seat 4,200 persons very comfortably, and the promenade will protect at least 5,000 persons more from the rain and sun. The whole cost of the amphitheater and fence was about $8,000.

Very respectfully,

J. CHRISTY WATSON.

Sec. Cole County Mechanical and Agricultural Association.

COLE COUNTY—ITS ADAPTABILITY FOR FRUIT GROWING.

By Dr. N. De Wyl.

(Riverside Vineyards, Jefferson City.)

The county of Cole, situated in the center of our great State, under 38° 20′ latitude north, and 92° longitude west, has proved, after a series of experiments of fifteen years' duration, on a large as well as small scale, to be eminently adapted for growing and raising, to perfection, all kinds of fruit usually known to the temperate zone.

The soil, although differing somewhat according to localities, is everywhere fitted for grapes and fruit. The Missouri river bluffs, on the north-east boundary of the county, are overlaid with a rich, sandy loam, varying from fifteen to twenty feet in depth, mixed with humus, and producing large crops of grapes, peaches, apples, cherries and strawberries; but the fruit grown on this light soil seems to be deficient in sugar and flavor, and does not equal fruit grown on more loamy and less rich land.

The eastern and southern portions of the county are broken and rolling, and covered mostly with hickory and different kinds of oak, or so-called barrens, overgrown with a dense growth of hazel-brush and sumac. The soil is a heavy, red loam, from eighteen to thirty inches deep, mixed often with gravel and flint-stone, and underlaid with a limestone formation. This soil produces splendid crops of grapes, and peaches of the very best quality; but often not equal in quantity to the crops of fruit grown on the bluffs. This peculiar

variety of soil retains its moisture in dry weather, and, when properly subsoiled, does not suffer from the effects of wet weather.

The western portion of the county is nearly as broken and rolling as the southern part, with a deep, loamy soil, which, near the western boundary, shows the deep, black color of prairie lands. This section does not seem quite so well adapted to the grape, although producing splendid apples and peaches, and orchards look healthy and productive, notwithstanding the little care bestowed upon them.

The climate of Cole county is generally very favorable to fruit growing, although warm fall weather in November and December, and late spring frosts in March and April, are not unfrequently injurious to peaches and cherries. My own experience leads me to entertain the belief that warm weather in autumn and early winter is more injurious to fruit than cold weather in spring, because the buds are apt to grow and swell, and are liable to suffer from sudden changes of temperature, when the thermometer ranges from ten to fifteen degrees above freezing point, to ten to fifteen degrees below zero, in a space of twenty-four hours—a change which bursts the sap vessels, and invariably destroys the germ of life in the buds.

The mean temperature of winter in the last five years was about twenty-nine degrees Fahrenheit, and three degrees below freezing point, for the months of December, January and February. The winter temperature is very changeable, and sudden variations of fifty degrees in twenty-four hours are not unfrequent; this is often fatal to the more tender and less acclimated varieties, though not generally injurious to our common sorts. Intense cold, such as will kill trees and vines outright, occurs very seldom; and during an experience extending to fifteen years, I recollect only one winter, that of 1863–4, when large peach trees were killed to the ground.

Our spring months are usually rather stormy and windy, but two or three days of clear sunshine invariably melt the frost out of the ground, and when three or four clear days follow, the ground is ready for the plow. The mean temperature for the months of March, April and May is about fifty-one degrees Fahrenheit, May being often quite warm. Injurious night frosts commonly cease after the first of April, although white frosts have been known to occur in May. Peach trees bloom from the middle of March to the middle of April; apple trees during April, and grape vines in May.

The months of June, July and August are hot, and sometimes frequent rain-showers, and moist, sultry weather prevail, injurious to the growing grape crop, and producing the much-dreaded rot; high, dry places, exposed to the varying currents of the atmosphere, mostly escape unharmed, while low lands suffer.

The fall months are usually dry and pleasant, with cool and agreeable nights, and a mean temperature of fifty-nine degrees Fahrenheit. The first light frosts occur about the 25th of October, and, after a few

days of stormy weather, Indian summer, the most delightful season of the year, sets in, and real winter rarely begins before the middle of December.

The average rain-fall of Central Missouri varies from 32 to 35 inches a year; the winter months with about 5 inches, the spring months, 7½ inches, the summer months, 11 inches, and the fall months, 12 inches.

Drouths prevail during some seasons, but are seldom dangerous to fruit. Insects are not more troublesome here than elsewhere, and wholesale devastations by grasshoppers and other migratory insects have never been known to occur.

The price of farms varies very much according to locality—improved lands ranging all the way from $10 to $150 an acre—and there is no place in the county distant over eight miles from a railroad or river.

Among the fruits raised in this county, the grape takes the lead, and a large amount of capital and labor is already invested in this line of business. Some sixty or seventy acres of vineyards are already established, with a fair prospect of doubling the acreage next year. The number of gallons of wine made last year exceeded ten thousand, and the total value of the grape crop can not have fallen much short of twenty-five thousand dollars.

The leading varieties grown are: Concord, Virginia Seedling and Catawba; next come Herbemont and Goethe; while numerous other sorts are being tested by way of experiment. No total failure of the grape crop has occurred in the last twelve years.

Next in importance after the grape comes the apple—a fruit which is found in abundance and at reasonable prices in our markets all the year round. Apples attain their highest perfection on our bluffs and high ridges, and large shipments of fall and winter apples are made East and West.

The varieties mostly grown are the Rawle's Janet, McAfee's Nonsuch or Large Striped Pearmain, Newtown Pippin, Yellow Bellflower and Golden Pippin, while numerous other kinds are grown in less numbers.

Cider and vinegar are also manufactured to a large extent.

Pears are not raised on an extensive scale as yet, but those grown seem to succeed very well, and the much dreaded fire-blight has not done much damage of late years, owing, in my opinion, to the greater care bestowed upon the culture of this fine fruit. The Bartlett, Seckel, Duchess d' Angouleme, Vicar of Winkfield, and a number of other sorts, have produced an abundance of splendid fruit here.

Peaches are generally planted, and invariably of the most excellent quality; seedlings being almost a sure crop every year, while the so-called finer varieties, or budded peaches, are sometimes winter-killed; a crop of this most delicious fruit every three years, however, will reward the planter very well for his trouble. The Early York,

Hale's Early, George the Fourth, Yellow Rareripe, Oldmixon Free and Cling, and Heath Cling, produce very large and fine fruit here.

Cherries of all the leading varieties have been planted to some extent—all the Dukes and Morellos being sure bearers; and superior cherries find a ready and remunerative market in their season. The trees, when properly attended to, are healthy, grow fast, and bear young. The Early Purple Guigne, Early Richmond, May Duke, Governor Wood, Black Tartarian, and various heart cherries are mostly raised.

Quinces succeed well, although slow growers and bearers, and after they commence fruiting, bear large and sure crops, and are quite remunerative, single quinces not unfrequently selling for five and even ten cents a piece.

Strawberries, with careful culture, are very productive and profitable. Wilson's Albany is the principal variety cultivated. There are several acres of this fruit in the county. Other small fruit, such as gooseberries, currants, raspberries and blackberries, are cultivated to some extent, and appear to do well. Their fruit is of excellent quality.

Plums, apricots and nectarines succeed admirably, and, but for the curculio, would prove extremely profitable. As it is now, it does not pay to plant them largely.

No county in the State has greater facilities for the culture and shipment of fruit than Cole. The Missouri Pacific Railroad and Missouri River run east and west through the county and along its border; the Louisiana and Missouri River Railroad will soon place us in direct communication with Chicago, and the Jefferson City and Lebanon road, now building, will open an outlet to the South, so that the best markets of the country will be open to the fruit growers of the central county of our State.

COOPER—Hon. M. McMillan.

1. The leading staples of this county are, wheat, oats, corn and rye.

2. Wheat is most exported, then corn, then oats.

3. The area of wheat gathered is greater than in 1870; yield about the same; quality do. Corn much better than it was in 1870; am told it weighs less. Oats, greater breadth sown than last year; yield lighter per acre.

4. Wheat produces from ten to thirty bushels—average, say fourteen bushels per acre. Corn, forty bushels per acre, average; oats, thirty bushels; rye seldom harvested, but fed to swine in the field. Potatoes light; sweet potatoes do.

5. There is a manifest increase in swine; slight in mules and horses.

6. One road, the "Osage Valley and Southern Kansas Railroad," completed, and running from the county seat — Boonville — south through the county; and the Tebo and Neosho in course of construction. This latter will be completed and running next year, which will give us the Chicago market, in addition to the St. Louis market, which we now enjoy by the Osage Valley and Southern Kansas Railroad, and the Missouri River.

7. The Missouri River.

8. I can give you no reliable information in regard to immigration into this county. Generally, we are getting a good class of newcomers.

The fruit crop was an average one.

I have tried to inform myself in regard to this matter, and believe the above is, in the main, substantially correct.

BOONVILLE, MO., December 4, 1871.

Corresponding Secretary Mo. State Board of Agriculture:

DEAR SIR: I have the honor to report the following as the condition of the Cooper County Agricultural and Mechanical Association. The Association was organized on the 7th of February, 1867. A lease of about seventeen acres of land within the limits of the city of Boonville was taken by the Board of Directors, for the period of five years, for the purpose of holding the annual exhibition of this Association; the Association having the privilege of purchasing said lands at the expiration of the lease, at a stated price.

Improvements have been made to the amount of about $2,000 upon said grounds, and they are now in a commodious and useful condition.

The Board of Directors each year offered a liberal list of premiums for almost everything produced by the farmers and mechanics of our section of country, and also liberal premiums for horses, cattle, sheep and hogs. The competition has been spirited and encouraging in the extreme, and the improvements made in agricultural and mechanical pursuits are very cheering. The Association, in making improvements and awarding liberal premiums to competitors, was unable to discharge all its liabilities until after the annual exhibition of 1871; and after offering cash premiums in 1871, on grain, horses, cattle, sheep, hogs, agricultural and mechanical implements, poultry, needle-work, preserves, etc., etc., amounting to about $2,500, and after paying out, in cash premiums, about $1,700, and defraying all expenses, and paying off the indebtedness contracted in previous years, there is now in the treasury about $500.

The total receipts for 1871, were $3,741.50; amount of expenditures, premiums, indebtedness, etc., paid, $3,227.56.

The number of entries on the books of Secretary, of animals and articles, were about 750. Our memberships are only for one year, and expire at the close of the fiscal year, with the exception of about twelve life members, so that the life members are the only members, at this time, of the Association.

The Cooper County Agricultural and Mechanical Association is now in a very healthy condition — having out-lived every local jealousy; and this fact, taken in connection with the flattering prospects now possessed by the city of Boonville, will, no doubt, add greatly to the already encouraging prospects of the agricultural and mechanical interests of Cooper and surrounding counties.

All of which is respectfully submitted.

JOHN COSGROVE, *Secretary.*

CRAWFORD—J. G. ANDERSON.

The leading agricultural staples of Crawford county are wheat, corn, oats and hay.

Exports consist mostly of wheat. Home demand consumes the corn, oats and grass.

The crops for the year 1871 are below the general average of 1869 and 1870. This is attributable to the continued drouth in June, July and August.

Average yield of wheat 15 bushels per acre.
" " corn 35 "
" " oats 40 "

There is a perceptible increase in all kinds of live stock, except sheep. Improved stock is being introduced among our best farmers.

The nearest point at present to a railroad is Cuba Station, on the Atlantic and Pacific Railroad, eight miles north from our county seat.

The St. Louis, Salem and Little Rock Railroad runs through this place—junction with the Atlantic and Pacific Railroad at Cuba. This road is now located—grading will commence by Jan. 1, 1872. No facilities for transportation except railroad.

"The ultimate western market for our produce" is the iron mills, furnaces and mills of this and Dent counties.

Immigration for the past year has been very light.

The iron and lead ores in Crawford county are in great abundance, of the purest character. The Scotia Iron Furnace, about one-and-a-half years in operation, on cold blast, yields about twenty-one tons per day; average per cent., sixty-eight. This is a charcoal furnace. The abundance of ore, timber and water will justify at least a half

dozen more first-class furnaces. The building of a new railroad will, in a short time, secure healthy immigration and investment of Eastern capital. This is one of the healthiest localities in the State. The cause of education and morals of the people will compare with any portion of Missouri.

The iron ore in this county consists of blue specular red oxide and also several good surface deposits of brown hematite. The lead ore in this county is rich, and free from felspar and other foreign substances. We need several good first-class lead furnaces. We also need good grist mills; those we have are of an inferior quality. We need a healthy immigration of first-class laboring men and mechanics of all kinds and grades.

Recent visitations to this county by Eastern men, and the purchase of mineral lands, have caused an increased interest in that direction.

Fruit growing is a perfect success. All kinds of fruit and cereals known to this clime can be successfully grown here.

(BY NEWTON JONES.)

1. The leading staples of Crawford county are corn, wheat, oats and potatoes.

2. The commodities most exported are—1st, wheat; 2d, corn; 3d, potatoes.

3. The crops of 1871 were hardly as good in many localities as those of the previous year, on account of drouth in spring affecting wheat and oats, and drouth in latter part of season affecting corn, late potatoes, etc.

4. Estimated average yield is as follows:

Wheat about five or six bushels to the acre.

Oats about twenty-five bushels to the acre.

Corn about twenty bushels to the acre.

Rye, scarcely any raised.

Barley and hemp, none raised.

Tobacco, very little exported.

Castor beans, don't know of an acre in the county.

Broom-corn, only raised for home consumption.

Irish potatoes, cut *very short* by drouth and potato bugs. Will have to import seed.

Sweet potatoes, fair average crop, about seventy-five or one hundred bushels to the acre.

Flax-seed, none raised.

Buckwheat, very little.

White beans, not known.

5. There is an increase of mules and swine—the latter of improved kinds.

The nearest point to railroad from our county seat, Steelville, is Cuba on the Atlantic and Pacific Railroad. A railroad will be commenced this fall or next spring, running from Cuba through Steelville to Salem, Dent county, and probably on to Batesville and Little Rock, Arkansas.

Our market is St. Louis.

No data can be given in regard to immigration. Very little coming in.

DADE COUNTY.

REPORT OF DADE COUNTY AGRICULTURAL AND MECHANICAL SOCIETY FOR 1871.

Corresponding Secretary State Board of Agriculture:

SIR: I have the honor to submit for the consideration of the State Board a report of the third annual fair of the Dade County Agricultural and Mechanical Society.

The Society not having heretofore corresponded with the State Board, it will not be improper to give a short history of its organization:

The county court, on petition, at the May term, 1869, incorporated the Society, which was duly organized, and held a fair in the month of October following, which was very well attended, but did not pay expenses, owing to the fact that many of the subscribing members failed to pay the membership fee of $2.50, on the faith of which the premium list was published.

A fair was held by the Society in the month of October, 1870, which also failed to pay expenses, for the reasons before stated. This failure induced the members to change the Society into a joint stock company, with shares of the denomination of $10, five shares only to be held by the same person. This movement was very promising at first, but it was not long before considerable opposition was manifested, which inconvenienced the Society in the collection of the calls on the stockholders. The Society has a fair prospect of success in the future. The people are awakening to the importance and benefit derived from such an institution, and will not now permit a relapse.

Dade county, in area, consists of 520 square miles, about one-half timber, the remainder prairie; is watered by Sac river, Turnback, Sow's, Horse and Cedar creeks and Muddy Fork of Spring river. Coal and iron abound in large quantities; lead and copper are found in several parts, but have not been worked. There are some 2,000 farms in the county, in area from 120 to 1,000 acres.

Wheat, oats and corn are the staple products. The wheat crop of 1871 was light. The late spring frosts, and a worm known as the "stalk borer," did much damage to the wheat crop. The worm answers the description of the *Meromyza Americana*, (page 159 Riley's first report, plate 2, figure 28,) as described by the State Entomologist. The wheat crop on the Turnback and Rock prairie was troubled with this pest.

The yield of wheat will probably exceed 150,000 bushels, and was sold at eighty cents to one dollar per bushel.

The oats made a very light yield. A few farmers who had sown the Surprise and Norway report large crops. It is impossible to estimate the total yield.

The corn crop is very large; the total yield will not fall short of 600,000 bushels; it is marketed in Greenfield, at twenty-five cents per bushel.

Early Irish potatoes were abundant, but the late crop is considered a failure, on account of the drouth.

Sweet potatoes are very fine, but are not very extensively cultivated.

Greenfield, the county seat of Dade county is a very pretty village of some 600 inhabitants; it is healthy, and is remarkable for its good order, cleanliness, and the nature of its buildings. The Kansas City and Memphis Railroad, when completed, will run through the town. The division between Springfield and Greenfield is rapidly approaching completion.

The Society has purchased, and inclosed with a post and slat fence, twenty acres of land, for the purpose of a fair ground, within a half mile of the town. A good frame building has been erected, and steps taken to set out a hedge and to erect suitable stalls and pens for stock.

The third annual fair, commencing on the 27th of September, was very well attended. There were 283 entries, and premiums awarded to the amount of $398.75. The display of fruit was the best ever exhibited in the county. Mr. E. T. Wasson exhibited nineteen varieties of the choicest apples, worthy of a premium in any county. The exhibition of farm products was very large, and all were excellent.

Several thorough-bred animals were exhibited; but the glory of the farmer of Dade is the mule. Stock men were universal in pronouncing the exhibition of mules the best ever witnessed.

The ladies were present, and exhibited many beautiful as well as useful articles, for which they can not receive too much praise.

The financial condition of the Society is as follows:

Total amount of stock subscribed, October 1st, (185 shares.)		
Value		$1,850 00
Amount of calls	$1,387 50	
" collected	810 65	
Amount due the Society on calls	$576 85	
Expenditures		$1,016 70
Receipts of fair	$363 85	
Expenditures	495 73	
Deficiency for 1871	$131 88	

Respectfully, etc.,

O. H. BARKER,
Secretary.

GREENE—S. N. INGRAM.

In answer to your questions, I report that our leading staples are wheat, corn, oats, Irish potatoes and apples. Our principal exports are, wheat, live stock, hides and apples, in the order as they follow.

The crops of 1871, as compared with 1870, are decidedly better, in quantity and quality. Grapes were nearly an entire failure this year.

The average yield of wheat this year was probably from fifteen to eighteen bushels per acre; oats, from thirty-five to forty; corn, not less than thirty-five to forty; rye, thirty; barley, forty; broom-corn grows fine and yields well; Irish potatoes yield from sixty to two hundred—probably ninety bushels per acre will be the average.

There is a small increase of horses, mules and cattle, but a large increase of swine and sheep.

The Atlantic and Pacific Railroad furnishes the only means for transportation.

Our market is the new settlements in the West.

There is some immigration. The land is sold at a very high figure. The Atlantic and Pacific Railroad holds a vast amount of land.

I will further mention that grass, principally timothy, has been raised considerably here, and yields from one to two tons per acre.

HENRY COUNTY.

Corresponding Secretary State Board of Agriculture:

In the First Annual Report of the State Board of Agriculture, published in 1865, in Appendix, page 75, is found, from the pen of L. C. Marvin, an old and much respected citizen of this county, what was then a full and correct statement of the resources of Henry county; together with much valuable information concerning her

natural advantages for stock-raising, fruit-growing and agricultural purposes. That report falls so far short of representing our present condition, except location, soil, etc., that it becomes a matter of county pride with us that the report be so amended as to conform to her present standing, as the seventh county in the State in population and wealth.

We herewith transmit such additional items, together with the first report of Joint Stock Agricultural and Mechanical Association of Henry County:

Henry county contains 765 square miles of territory, making an area of nearly 500,000 acres. Of this there is not over one-thirtieth that can be considered waste lands. Even this is often densely timbered, and, with other timbered lands, furnishes an ample supply for all practical purposes. The population, in 1870, was 24,000. The climate is most healthful, with short and mild winters, while the spring, summer, and autumn are delightful. In north latitude 38°, and situate on the southern slope and near the center, east and west, of an elevated ridge or divide of prairie country, extending from the Missouri River on the north to the Osage on the south, and from the junction of the two rivers to the western border of the State, comprising an area of country unsurpassed for its fertility of soil, its equable distribution of timber and water, and including in a great degree the extensive coal fields of South-west Missouri, all together forming a greater extent of first-class farming land than is found anywhere else in the Great West. In the heart of this region is Henry county, with the Missouri, Kansas and Texas Railway running diagonally through her limits, giving direct communication from Sedalia on the Missouri Pacific Railroad to the Lone Star State; other projected railways give equal facilities, of which the Kansas City, Memphis and Mobile Narrow Gauge Railway stands pre-eminent; one hundred and twenty miles of this road-bed is nearly completed, and the track laying begun from Clinton, Henry county, to Osceola in St. Clair county, south, a distance of twenty-five miles. Other lines are contemplated.

The general surface of the country is undulating; the soil rich, fertile and often of great depth, with numerous water-courses. Two of these are classed on the Government returns as rivers; Grand River, which runs directly through the center of the county from west to east, and the Osage, which forms part of the south-eastern border. They vary in depth from five to twenty feet, with a medium force of current. Of creeks we have a goodly number: Deep Water, Big Creek, White Oak, Tebo, Honey Creek and Bear Creek, all tributaries of Grand River, and durable streams, upon the banks of which good timber is found in abundance. Many of these streams might be made available for manufacturing purposes. We have two flouring mills upon the banks of Grand River; the flour of one of which took the premium at our last county fair. There are also many fine saw-mills located upon the banks of the different streams.

Timber.—The timber is of the kind found throughout South-west Missouri, and consists mostly of oak, in almost all its varieties, walnut, ash, hickory, elm, maple, lime or basswood, locust, pecan, sycamore, cottonwood, mulberry, etc., etc. Our wild fruits are mostly plum, pawpaw, persimmon, crab-apple, black and red haw, blackberries, strawberries, whortleberries, which are found in abundance; as also the grapevine, which seems to be in its native element. We have also the honeysuckle, bitter-sweet, wild cucumber, and pea, in the way of wild vines.

Land.—There is no Government land in this county, except some waste land in the south-eastern portion of the county, which would not exceed ten thousand acres. That might be made valuable, on account of fine beds of limestone and cotton-rock, which is found extensively in this region.

Improved lands, lying along or near the railway, sell from $25 to $40 per acre; unimproved, from $10 to $30 per acre; timber land, from $10 to $40 per acre; unimproved prairie, lying some distance from town and railway, commands from $5 to $15 per acre.

Minerals.—We have limestone, sandstone, and occasionally flint, and bituminous coal in immense quantities: the limestone, occurring in the coal measure, is principally found in the north and west portions of the county, whilst sandstone is more abundant south and east—these impress their character upon the soil; flint is only found on the hills of Grand river and the Osage, in the south-eastern part of the county. In the same vicinity, and below the coal measure, are extensive beds of gray, compact limestone, excellent for making lime; and also magnesian limestone, or cotton-rock, which will furnish a durable and beautiful building stone, when we have enterprise to develop it. In the same vicinity there is some indication of lead, but so far it has not been deemed of sufficient importance to prospect the same.

Coal will one day constitute a great source of wealth to this county; in fact, more than one-half of the county is an extensive coal field, of one or more veins of from one to three and a-half feet in thickness. Until recently it was only mined by surface digging; now there are a number of shafts sunk along the lines of railways, and elsewhere, that are furnishing a large supply of excellent coal. So far, the Pacific Coal Mining Company is taking the lead in drifting for coal; but as yet the business is only in its infancy.

No oil wells have yet been sunk; still there is indication of coal oil in one or two sections.

Towns.—The city of Clinton, the county town, is situate at the intersection of the Missouri, Kansas and Texas Railway with the Kansas City, Memphis and Mobile Railway, 175 miles from St. Louis, 80 miles from Jefferson City, (State capital,) 79 miles south-east of Kansas City, and 61 miles from Fort Scott; has a population of three thousand inhabitants, six churches. (several of them large and costly

structures,) two newspaper and job offices, two banks in full operation, a splendid new brick district school-house, costing $25,000, four hotels, two flouring mills, a wagon and carriage manufacturing establishment, woolen mill, pork packing establishment, two cooper shops, etc., etc., and all together a town with the spirit of improvement manifest on every hand.

Windsor, on the Missouri, Kansas and Texas Railroad, and in the north-east part of this county, is also a flourishing town of one thousand inhabitants. Calhoun and Montrose, on the same railway, are improving towns; whilst smaller villages, at convenient distances for trading and shipping points, are found throughout the county.

Mills.—Henry county has many fine mills, as already indicated, sufficient to manufacture the wheat now produced in the county. The principal of these are the Tebo Mills, Meddecoff Mills at Clinton, mill at Calhoun, Austin City Mills at Montrose, and Grand River and Cook Mills on Grand River. Tebo Mill, now owned by Reihl & Bauman, is forty by one hundred and thirty-five feet, and can manufacture one hundred and seventy-five barrels of flour daily. Since this mill has been in operation it has bought and manufactured into flour, from August 15, 1869, to July 23, 1870, 80,000 bushels of wheat; from July 23, 1870, to July 1, 1871, 88,000 bushels; from July 1, 1871, to November 1, 1871, 75,000 bushels of wheat. They make three grades of flour: Best brand, "Tebo;" second best, "Shawnee Mound;" third rate, "Grand River." The greater part of the "Tebo" finds a ready sale in the markets of Boston, Mass., Providence, R. I., and St. Louis, Mo. They pay 76 cents per barrel freight from here to St. Louis, and from $1 10 to $1 60 to Boston. They also make their own barrels, for which they have established a large cooper shop.

Agricultural Societies.—The Joint Stock Agricultural and Mechanical Association was chartered in November, 1869. The first Board consisted of A. C. Marvin, R. Z. Fewell, Thos. E. Owens, Isaac M. Cruce, John L. Gray, John A. Bushnell, James Hogan, Moses W. Sevier, John O. Covington, Robert Allen, Jacob C. White, R. K. Murrell, Burt Holcomb; but many of those are past and gone, and are numbered among the dead. The present Board of Directors are Dr. J. H. Britts, President; Col. Wm. H. McLane, Vice-President; Wm. H. Cox, Treasurer; D. H. Pierson, Secretary; R. Z. Fewell, H. P. Epperson, J. P. Waddell, John Hopton, Wm. M. Doyle, D. R. D. Dobyns, and Joseph Reid. Our last Annual Fair was held in September, commencing on the 27th, and lasted four days. The attendance was not as good as in some former years; still, considering the hard times and scarcity of money, perhaps it was as well as could be expected. We did not quite clear expenses, (by $73 13,) from the fact that premiums were liberal—perhaps too much so, paid as they were in cash; nor was the display of stock so large or fine as formerly.

I herewith append a list of premiums, together with those who took them, and the amounts:

No.	Name of Entry.	Articles.	Premium.
	Willie Temple	Two pairs turkeys	$4 00
	George Dorman	One pair Bantam chickens	2 00
	S. D. Garth	One pair Bramah chickens	2 00
	D. B. Page	One pair Dominick chickens	2 00
9	D. B. Page	Boar, Chester White	3 00
10	J. Hanger	Boar, "	3 00
11	Capt. J. Curtis	Sows, "	3 00
13	I. N. Rogers	Pigs, "	3 00
14	Dr. J. H. Britts	Boars, Berkshire	3 00
16	Dr. J. H. Britts	Sows, "	3 00
18	Roberts & Bro	Pigs, "	3 00
19	Dr. J. H. Britts	Boars, Poland-China	3 00
20	J. P. Waddell	Boars, "	3 00
22	J. P. Waddell	Sows, "	3 00
23	W. J. Fewell	Pigs, "	3 00
24	Dr. J. H. Britts	Boars, of any age or breed, (sweepstakes)	10 00
25	J. P. Waddell	Sows, of any breed, (sweepstakes)	10 00
26	Dr. J. H. Britts	Brood sow	5 00
26	F. Dunning	Fatted hog, any age	5 00
28	H. B. Winslow	Bulls	10 00
29	James W. Cole	Bulls	10 00
30	F. M. May	Bulls	7 50
32	R. P. Wright	Cow	10 00
35	W. J. Fewell	Heifer calf	5 00
36	John Adamson	Work oxen	10 00
37	James Cole	Bull of any age, (sweepstakes)	25 00
37	W. J Fewell	Cow of any age, (sweepstakes)	15 00
38	M. Hukill	Pair Geldings	10 00
41	D. D. Black	Jack	10 00
43	J. L. Stone	Jack	7 00
45	D. D. Black	Jacks of any age, (sweepstakes)	25 00
46	J. L. Stone	Jennets of any age, (sweepstakes)	15 00
47	Richard Jenkins	Mule, fastest	25 00
48	W. H. Fewell	" draft	10 00
49	John Legg	" harness	10 00
50	G. F. Dunning	" harness	10 00
51	J. P. Legg	" saddle	10 00
52	W. H. Cales	Stallion, draft	15 00
53	J. P. Waddell	" draft	10 00
54	George M. Gabbart	" draft	8 00
56	A. R. Caldwell	" colt	5 00
57	A. R. Caldwell	Draft mare	5 00
58	M. Hukill	"	7 50
59	A. R. Caldwell	"	7 00
61	James Swartz	Draft mare colt	5 00
62	M. J. Condon	Stallion, saddle	20 00
63	S. D. Garth	Mare, saddle	15 00
65	S. D. Garth	Horse, mare or gelding, under saddle, (sweep.)	20 00
66	N. J. Douglass	Horse, mare or gelding, (sweepstakes)	50 00
67	Amanda Hukill	Ladies' equestrianism	20 00
68	Jacob Hukill	Boys' riding	10 00
69	H. B. Jones	Harness, stallion	20 00
70	George M. Gabbart	" stallion	20 00
72	J. P. Waddell	" stallion colt	5 00
73	S. D. Garth	" mare	10 00
74	B. G. Lewis	" mare	8 00
76	George F. Royston	" mare colt	5 00
77	J. P. Legg	Roadster stallion	20 00
78	J. T. Barker	" mare	10 00
79	J. L. Bridges	" gelding	10 00
80	J. T. Barker	Horse, mare or gelding, trotting	75 00
81	G. W. Hawkins	Stallion, throughbred	20 00
82	G. W. Hawkins	" "	15 00
85	S. D. Garth	Mare, "	15 00
86	J. W. Victor	" "	10 00
89	G. W. Hopkins	Stallion of any age or breed, (sweepstakes)	25 00
90	M. Hukill	Mare of any age or breed	25 00
91	J. T. Barker	Brood mare	10 00
93	W. H. Fewell	Draft mule	5 00
95	J. P. Waddell	"	7 00
96	F. M. Lettles	"	5 00
97	Geo. M. Peak	Mule colt	5 00

The amount paid in premiums was something over $1,200.

The association numbers about 135 stockholders, of shares of twenty-five dollars each, and at present are a little in arrears; but I think, by another year, they will be able to pay off their debt, and leave a margin to fit up the grounds in ample order. The fencing and amphitheater need repairing badly; also, some new buildings should be added. But when we take into consideration the awful devastation and destruction that followed our late war, particularly in this section of country, which might be well termed the battle-ground of Missouri, I think we have done well to have even a relic of our fair-ground inclosure left. We have inclosed twelve acres—one of the most valuable pieces of land (for this purpose) in Henry county.

POPULATION AND PRODUCTION.

Our county, though greatly depopulated during the war, has, since the close of the same, improved in population most wonderfully, and still the tide of immigration fast flows in—some stopping with us, and some going to our sister counties and States. The staple productions of this county are corn and wheat.

Wheat is getting to be one of the main crops, and since we have come into the possession of those fine mills, (spoken of in a previous article,) the farmers here find a ready market at home, and are incouraged in raising wheat in abundance. Farmers use the wheat drills, and those of the latest and best patterns, yet much sowing is done broadcast; our average crop is about twenty bushels to the acre.

Corn is also raised in great abundance, and, in fact, is the principal crop, used most for feeding and fattening hogs and cattle, by which our farmers and stock-raisers reap a handsome reward; since we have a direct railroad line from this point to St. Louis, and a daily mail, together with telegraphic communication, the shippers are enabled to get the latest prices, thereby knowing just when to ship, and just what to give while buying, or, as the farmer says, "when to hold on and not sell."

Rye is sown by some farmers, but not in large quantities.

Oats has been extensively grown, and is esteemed by our best farmers to be a valuable crop, and very certain of a good yield; average crop from forty to eighty bushels.

Buckwheat—This grain is fast gaining ground among our farmers, who favor it far more than in years gone by. You can hardly step into a farmer's house in winter and get the privilege of placing your feet under his table, without having placed before you these nice, delicious hot buckwheat cakes.

Sweet potatoes we raise in great abundance and of fine quality. Of Irish potatoes we have the peachblow, galena, English fluke, early rose, red and white neshannock, and mercer. Neither my experience, observation, nor information enables me to state which of these is

the most productive, or what soil is best adapted to them. The yield in this county is from one hundred to three hundred bushels to the acre.

Sorghum—The amount planted this year is much larger than in any previous year, and since the introduction of machinery manufactured for that purpose, molasses of the finest quality is made, as well as the producing of sugar.

Sheep raising has not as yet been carried on very extensively. Some farmers have flocks varying from twenty-five to one hundred and fifty in a flock, principally for the sake of the wool for home use. Natives intermixed with the Merino, comprise the general character of the sheep. They are healthy, with the exception of the scab, which has prevailed extensively; this disease, in connection with destruction by dogs, as mentioned hereafter, bids fair to destroy the sheep interest of this county; otherwise it might be made very profitable, as no branch of husbandry promises a better return for so little labor and outlay. Scab does not prevail, except when caught by contact with infected sheep, and might be eradicated by proper remedies and isolation.

Mr. W. B. Fewell has lately brought from Ohio some thoroughbred Cotswolds, which we expect to materially improve the breeds in this county.

Dogs are doing much damage—an evil which ought to be remedied by stringent dog laws.

Hay and tame grasses—Prairie grass is still found in great abundance, but whenever meadows have been made, timothy is the prevailing grass. I know of but few instances, as yet, where land has been seeded with any of the tame grasses for the purpose of pasturing. Timothy yields about two tons per acre; prairie grass yields about one to one-and-a-half tons to the acre.

Hedges are being planted almost universally among the farmers. They deem them the best fence, and far the cheapest.

Horses are easily raised, and since the war, many farmers have turned their attention to that branch of business with marked success. There are a great number of graded stallions—some of them fine horses—but evidently it is a mistake to breed from such. What we want is thorough blood: of such there are only a few in this county.

Fine mules are raised to a moderate extent, and many are yearly shipped South; the trade is reviving since the war, and will soon again become a profitable branch of stock raising.

There was a time in the history of Henry county when she had no fine blooded hogs. But now, Berkshire, Chester Whites, and Poland China are becoming quite common, and are leaving their mark upon the stock of the county. The leg and snout are shortened materially, and the fattening qualities improved. There were shipped from this county last year 13,000 head, averaging 250 pounds, which will probably represent one-half of the surplus. This year it will greatly

exceed that amount. The number of hogs in this county has encouraged Messrs. Cameron & Moor to put up in Clinton a pork-packing establishment, where they are daily dressing from one hundred and fifty to two hundred head. This firm also manufactures their own casks, barrels and tubs.

Immense droves of beef cattle can be seen almost daily, passing and repassing—some for shipping, some for home consumption. Thousands, I might say, are shipped every year to St. Louis by rail, that are fed and raised in this county. I know of no person undertaking to raise stock for the dairy. Most all farmers make butter enough for their own use and some to sell, while many of the town people pride themselves on keeping their cows. The manufacture of cheese seems yet to be in its infancy. I know of but one person in our county who makes any pretense toward cheese making.

Within the last few years, orchard planting has received a mighty impetus. With the great State of Texas, and in a short time the entire South as a market, it would be impossible now to estimate the advantages that this part of Missouri will possess in fruit growing. Already our farmers are beginning to perceive it, and hundreds of large orchards are starting into existence—some of one and two thousand trees. The Jeniton is as yet the standard, though other varieties do equally well, and are extensively planted; among these are the Ben Davis, Big Romanite, Little Romanite, Huntsman, Bell Flower, Winesap, all of which do remarkably well. Peaches are also extensively planted, though not with as much certainty of good returns as with the apple.

Many vineyards are also started, and some wine making. The Concord, Norton's Virginia Seedling, and Rogers' Hybrids, seem to do the best. All these varieties are easily raised.

In conclusion, we beg of you to overlook the imperfection of this report. We have aimed to embody such information as we had at hand, and only such facts, as are reliable, but owing to the lateness with which it was begun, we can not but feel how imperfectly we have described the county of Henry, one of the finest in the State, when taking into consideration, soil, climate, health and its adaptation to wealth and happiness, and think that she is worthy of a better pen to laud her praises—wiser heads than ours to ferret out all those good qualities that redound so much to her honor.

JOHN H. BRITTS, *President.*

D. H. PIERSON, *Secretary.*

HOLT—T. C. DANGAN.

Corresponding Secretary State Board of Agriculture:

SIR: Herewith is submitted a report of the transactions of the Holt County Agricultural and Mechanical Association during the year 1871.

The Society held its fourth annual Fair at Oregon, commencing on the 13th day of September, and ending on the 16th. The unfavorable weather of the 13th and 14th no doubt tended greatly to reduce the attendance anticipated before the exhibition opened.

The receipts from all sources were—

For entry fees	$520 85	
Gate fees	487 70	
Booths, and peddlers' licenses	84 50	$1,093 05

The expenditures were—

For premiums awarded	$1,112 00	
Preparing grounds, stalls, pens, etc	209 81	$1,321 81

Showing a deficit of $228.76, which should have been balanced by appropriations by our county court, in accordance with the provisions of section —, chapter —, Wagner's Statutes, for the years 1870–71; but the majority of the court not being satisfied of the utility of such exhibitions, declined to advance the much-needed amount. The Society, however, is in better condition this year than it has been at the close of any year since its existence.

The number of premiums offered by the Society was 384.

The amount offered as premiums, in cash, was $1,475; the amount of premiums awarded, $1,112 — being 75 per cent. of the amount offered.

The entries made were, 117 horses, 14 jacks and jennets, 13 mules, 31 cattle, 29 hogs, sheep and poultry, 19 pacing and trotting animals, 6 machinery, 76 home manufacture and ornamental work, 67 products of the farm and orchard—making in all 372 entries.

The exhibition, in all its departments, was greatly superior to that of any former year.

The Society feel encouraged by the interest manifested by citizens of neighboring counties, a number of whom have given material aid by subscribing stock, and the hope is now entertained that the future exhibitions of the Association may become self-sustaining.

The cattle on exhibition embraced a number of fine herds, and indicate the rapid progress made in the improvement of cattle in North-west Missouri.

To John J. Cowan, late President of this Association, and the pioneer in the introduction of improved cattle, our people are largely

indebted for the infusion of a desire to excel in this branch of industry. The success of Messrs. Howard, Kenyon, Bloomer, Leoffer, and others, who have more recently engaged in the production of improved cattle, also illustrates the advantages of such production over that of the tough, indigestible scrubs that are even yet too common on our prairies.

The number of cattle returned by the assessor, for the year 1870, was 11,250; and it is estimated that this number has now increased to about 15,000.

The fine appearance of the hogs on exhibition fully illustrates the interest taken by our farmers in the production of the improved breeds. The Chester White, Berkshire and Magee are the leading breeds; the Suffolk has also been introduced.

The number of hogs returned by the assessor, for the year 1870, was 45,085; and a fair estimate shows the number to have increased to something more than 50,000.

A marked improvement has been made in horses, mules and jacks, within the past twelve months — a great advance having been made in numbers and breeds.

Horses for all purposes had many representatives on the grounds. The number of horses reported by the assessor for the year 1870, was 4,324; mules and asses, 1,036.

Holt county is well adapted to the culture of corn, wheat, rye, buckwheat, hemp, tobacco and fruit.

Of corn, the amount produced in 1871 may be safely put at 3,000,000 bushels; the average yield being not less than 45 bushels per acre. Some very large corn was shown in the Floral Hall, in September; and two stalks, the product of the farm of Mr. John Haigler, in the Missouri Bottom, measured *seventeen feet and one inch in hight.*

Although wheat usually yields well on our uplands, the product of the past season was materially lessened by the ravages of the chinch bug. The average for 1871, as shown by the returns of threshers, does not exceed 15 bushels per acre.

Rye is sown principally for pasturage; it is considered a profitable crop for this purpose.

Before the war, hemp and tobacco were raised in large quantities. Since then, very little attention has been paid to the cultivation of either. The low price of corn and pork, until now the leading articles of production in this county, has led many farmers to inquire into the propriety of engaging in the production of something more profitable; and it is hoped that they may be led to revive the cultivation of hemp and tobacco, formerly so profitable to all who engaged therein.

No less than 70,000 bushels of apples have been picked during the season just closed; a large portion of which have been sold to buyers from Iowa, Nebraska and Kansas, at prices ranging from 40

cents to $1 per bushel. The earliest apples commanded the highest prices; winter apples sold for from 50 to 75 cents. The cheapest were late summer and fall apples.

The leading varieties are, Early Harvest, Red Astrachan, Carolina Red June, Holland Pippin, Rambo, Rawle's Janet, Rhode Island Greening, Carthouse, Rome Beauty, Ortley, Ben Davis, Green Newtown Pippin and Winesap—all of which do well here.

Notwithstanding the discouraging influence of the blight, pear-culture steadily advances. Four years ago pears sold in Oregon at $6 per bushel; during the past season they sold at $1.50.

In October, 1862, nearly all the peach trees were killed by sudden freezing; and for several years thereafter very few peaches were raised, but during the past four or five years the quanttiy has increased largely. During the past season, the opening price was $2 per bushel, but toward the close it fell to 50 cents.

Plums, cherries and all the small fruits produce well on the uplands of Holt county.

The cultivation of the grape is becoming a leading product among our fruit-growers, and the quantity produced during the past season has been very heavy. The Concord is the leading variety. Birds are its worst enemies—the Baltimore oriole, cat-bird and robin destroying a large per cent. of the amount produced.

In their inroads upon our vineyards, the birds seem to be a little peculiar—some vineyards being almost ruined by them, while others seem to escape without injury.

The extraordinary amount of fruit produced in 1871 is remarkable, when it is considered that on six different days, after most of the fruit was in full bloom, the mercury ranged at or below the freezing point; and once—on the 11th of April—it was as low as 26°.5, with a heavy frost, ice half an inch thick, and the ground frozen.

Recent prospecting by Mr. Daniel Kunkle, one-half mile east of Oregon, has developed the fact that coal in large quantities exists, at a depth of 665 feet from the upper surface of the limestone layers of this county. An effort is to be made at an early day to sink a shaft, that some practical benefit may be derived from the immense wealth that lies beneath our feet.

The exhibition of the Holt County Agricultural and Mechanical Association closed by the election and organization of a new Board, composed of the following persons, to-wit:

PRESIDENT,
George Anderson.

VICE-PRESIDENT.
William Kaucher.

SECRETARY.
Geo. W. Cummins.

CORRESPONDING SECRETARY.
T. C. Dangan.

TREASURER.
James Scott.

MARSHAL AND COLLECTOR.
Samuel Stuckey.

DIRECTORS.
Henry Watson,
L. N. Howard,
John G. Cowan,
T. W. McCoy,
George Meyer,
Freeman Libby,
J. J. Cole.

JASPER COUNTY.

[The original report of Jasper county, as received from E. P. Searle, Esq., Corresponding Secretary of the Jasper County Stock and Agricultural Association, appears in reduced form in this volume, being deemed too lengthy to be published. This is to be regretted, inasmuch as it is undoubtedly one of the most interesting and ably written county reports published this year, and inasmuch, also, as its descriptions of the soil and native productions of Jasper typify to a certain extent, the aspect of the soil and country, and the general average of the productions and crops of the south-western counties of our State. Such portions only as were not of sufficient general interest have been left out.—ED.]

Corresponding Secretary State Board of Agriculture:

It would be a great pleasure to me to be able to give all the time and attention necessary to report the whole of Jasper county as it deserves, but I can not now do more than to report a few of its principal features. It might be well to first give something of its geography and topography, both as a basis for this report and as a matter of reference for subsequent reports.

Jasper county lies in the south-western part of the State of Missouri, alongside the south-eastern corner of the State of Kansas, and is the third county north of the north-western corner of the State of Arkansas. It has an area of 637 square miles. Its shape is nearly rectangular, and is twenty-one miles north and south, by thirty-one miles east and west. Spring river meanders through the entire length

of the county, near the center, from east to west; while the two streams, Dry-wood Fork on the north, and Center Creek on the south of Spring River, traverse nearly the entire length of the county in the same manner—all of clear, pure water, fed from springs, which can be found on nearly every quarter-section of land in the county; and then the numerous smaller streams, by which these springs find their way into the larger streams, complete a net-work of water courses, that prove Jasper county one among the best watered counties in the State.

Nearly one-third of the area of Jasper county is timber land, a part of which has been cleared for farming purposes. A very large proportion of the remainder can not be called first-class. The varieties are great, comprising all that are usually found in this latitude, the principal of which are the different kinds of oak and hickory, walnut, ash, elm, soft maple, mulberry and sycamore. The large amount of acorns and hickory nuts dropped every year helps to furnish the mast which is found in such great abundance. The principal nut and wild fruit producing trees, are the hickory, oak, walnut, pecan, chincapin, (the nut of which is equal to the chestnut for food,) mulberry, paw-paw, persimmon, plum, haw and hazel.

The surface of the country in the northern part of the county is a beautiful, undulating prairie with but little timber, in strips and spots along the streams; while the southern part is more abrupt and hilly, and has more timber along its streams, while the more strong and abrupt hills are covered with timber.

SOIL.

Jasper county contains 409,319.21 acres of land, about one-seventh of which is valley or bottom land found along Spring River and its tributaries, and is known as "the Spring River bottom lands," celebrated for their great fertility. 140,130.23 acres of land in Jasper county was returned as swamp and overflowed lands, and as such the General Government patented them to the State of Missouri, and the State patented them to Jasper county. There is really not a quarter-section of swamp and overflowed land in Jasper county; hence the above transaction has been called the "swamp land swindle," but it did not prove to be so much of a swindle after all, for it was thrown upon the market to actual settlers at $1.00 per acre, and thousands of acres were thus bought and partly improved; but the larger part at the close of the war was thrown upon the market at from $4.00 to $5.00 per acre, thus inducing purchasers from among the host of immigrants from the East and North during the four years from 1866 to 1870 and are now among the best cultivated and improved farms in the county. A portion of the purchase money going into the county public school fund, produced a principal of $250,000; the law providing that the interest alone can be used in payment of teachers' salaries.

The principal part of these swamp and overflowed lands are found upon the high, rolling prairies for which Jasper county is so celebrated. But, inasmuch as these same lands have now an improved taxable wealth, furnishing a revenue to the Government much in excess of what would have been received if the land had been sold at Government prices, allowing for the usual proportion to have gone into the hands of speculators, clearly proves that even the Government was not swindled; and we know Jasper county was not.

The soil of the bottom lands is a very rich and deep alluvial deposit. The uplands have a soil of two kinds or characters, viz: Black and red, with intermediate shades comprising the celebrated mulatto soil, so highly prized wherever known. I will not attempt any particular analysis of these soils, except to remark that what is known as the red belt underlies nearly all the soil of Jasper county, which seems to be rich in oxide of iron, phosphate of lime, and vegetable and animal deposits, more or less solidified, which decompose upon exposure to the air, and exhibit remarkable fertilizing properties.

The bottom lands are free from stone. The bluffs and hills skirting the bottoms contain ledges of limestone of excellent quality; in fact, lime-stone is the bed rock of Jasper county, generally lying deep, from fifteen to thirty or forty feet, except that it crops out in some of the ravines and from some of the bluffs. This limestone is first quality both for lime and building purposes. There are also ledges of dark granite, that works well, taking a good polish. A portion of the north-western part of Jasper county has a sandstone basis, and in many places it lies on the surface, with one or more sides level and polished, sometimes flat and sometimes from one to three feet square, and of various lengths, often over ten feet, presenting the shape of huge square timber, and will work well in walls with little or no dressing.

The soil in this part of the county is more of a sandy loam, and contains no horn stone.

THE CLIMATE

of Jasper county is mild, pleasant and salubrious, through a very large part of the year. During the winter months we have a large amount of warm pleasant weather, which illy prepares us for the cold storms of a few days length, which are at any time liable to come upon us during the winter months; but when they are over, and the sun again beams upon us so pleasant and even warm, we forget the stormy days We are subject to sudden changes, similar to Illinois and Iowa, but not in degree. It is never so hot by four or five degrees, and never so cold by eight or ten degrees, as in the latitude of Keokuk, Iowa.

THE SETTLEMENT

of Jasper county commenced about thirty-three years ago, and although its improvement and increase of population was far in ad-

vance of adjoining and contiguous counties, yet it did not probably exceed a population of 3,000 previous to the war. During the war, Jasper county suffered severely; it was entirely depopulated, and most of its improvements burned. Many farms had little else left but chimneys standing to mark the spot where the farm-houses once stood. Many partially destroyed orchards still remain to bless with fruit those who come in to possess the land. Thus, while the immigrant has been furnished with apples at less than one-half the price of corn, he also has the proof of the superiority of Jasper county as a fruit-growing region.

CARTHAGE,

the county seat of Jasper county, is beautifully situated upon the southern bank of Spring River, near the geographic center of the county, was laid out in the year 1842, and previous to the war had grown to a population of about 400. At the close of the war but little remained except old chimneys, a few ruined walls and rubbish, overspread with weeds, which also covered the places where the public square and the streets once existed. Carthage has now a population of 3,000, and Jasper county is estimated to have 18,000, which can not be correct, or else we have no maids, bachelors nor childless marriages, for the county clerk's statistics compiled from township clerk's reports of children drawing school money for the year 1871 shows 6,000 children in Jasper county. Besides the county seat, there are several flourishing towns in Jasper county.

THE TAXABLE WEALTH

of Jasper county, as shown by the assesssor's report, compiled during the fall and winter of 1870, is as follows: Number of acres of land, 344,052, valued at $2,217,335 00. I would remark that I don't know why the assessor's taxable acres does not agree with the county clerk's official report of the whole number of acres in the county, viz: 409,319 21, which at the above *pro rata* would give a taxable wealth of $2,660,574 86.

Jasper county contains about the 125th part of all the taxable wealth of the State of Missouri; and all this has come about like magic within the last five years. The causes that have induced such an immigration and improvement in so short a space of time are solely attributable to natural advantages, for we are far from navigable water-courses, have no large public works, and the railroads were all far away, and none of them indicated Jasper county on the direct line of their proposed routes. About seventeen months ago, the Missouri River, Ft. Scott and Gulf Railroad, passing through Ft. Scott, about fifty-five miles north-west of us, and continuing southerly through the border tier of counties in the State of Kansas, passed through Columbus, twenty-five miles west of Carthage, and on into

the Indian Territory, proving of some advantage to Jasper county in the wagoning of freight and express matter. But it cut off a very large share of our western market, and attracted a part of our immigration to the railroad lands, and to the Government lands farther west.

About eleven months ago, the Atlantic and Pacific Railroad passed our county eighteen miles south-east of Carthage, and went on into the Indian Territory, crossing the Missouri River, Ft. Scott and Gulf Railroad at a point about sixty-five miles south-west of us. A still greater advantage was gained by this railroad, in the way of mail and express matter, as it furnished a more direct communication with St. Louis, and also created a competition in freight to our advantage.

IMPROVEMENTS

Have been continually going on, of a more permanent character than formerly, if not with the same rapidity. There have been additions or good fronts built to the farm-houses; stables and barns have been erected and enlarged; more land has been brought into cultivation; a large amount of hedging has been done; hundreds of orchards have been set out; larger school-houses have been built; all the larger churches, bridges, mills, and factories, and, in fact, most of the larger and more permanent improvements of Jasper county, have been made in the hard times in the last eighteen months.

MILLS AND FACTORIES.

Jasper county has no more than just commenced the development of her manufacturing resources. There are now in the county three water-power saw-mills and six steam-power saw-mills; thirteen water-power saw and grist mills combined, and four steam-power saw and grist mills combined; one steam-power flouring mill alone; three wool-carding machines, and two woolen factories.

STONE COAL.

A few veins of coal have been discovered, and they, lying deep, have not been opened up, mainly from the fact that the extensive coal fields of Kansas were so near as to keep our market supplied at cheap rates. The water in our wells and springs is not injured by a close proximity to coal, and it has even been questioned whether Jasper county contained coal enough to supply the demand made by its own consumption; but the past ten months have settled that question, by the development of a very extensive coal bed, of excellent quality, about sixteen miles north-west of Carthage, near Medoc. It is fully equal to the best that has been in our market, and seems very abundant. There are two or three other places where coal un-

doubtedly exists in large quantities, but up to this time the coal bed near Medoc is the only one in the county that has been opened up.

MINES.

The mineral wealth of Jasper county is beginning to be a matter of vast importance. The greatest mining attraction at the present time is the new mines eight miles south of Minersville; where two new towns have sprung up, as if by magic, and grown until, not being very far apart, they have grown together, viz.: Joplyn and Murphysburg—distant from Carthage about twelve miles, south-west. A few prospect holes had been made at this point before the war, but it remained for a few of the present citizens of Jasper county to discover the untold wealth which there lies buried. A few miners had been quietly prospecting two or three months, until last spring and summer (1871) their mineral began to attract attention, and hundreds of persons rushed to the new mines, lured by the prospect of immediate wealth, many of whom sunk their shafts to the end of their purses, and, not finding lead in paying quantities, left their prospect holes to the more fortunate; for the mineral was there, and many others have found it, and have made, and are making, their fortunes. There are about five hundred men now at work, and from thirty to fifty shafts sunk, that are paying well. Soon after the mineral began to accumulate, a smelting furnace was erected, with a capacity of smelting three thousand six hundred pounds of mineral every twenty-four hours; and although they have worked night and day (and Sunday, too, I am sorry to say,) yet they have not been able to work up the mineral as fast as it accumulated at their furnace, and have now on hand five hundred thousand pounds of mineral ready for smelting. Another furnace has just been completed (November, 1871) which, by running day and night, smelts four thousand five hundred pounds of mineral every twenty-four hours. There are two other furnaces in process of erection, and, with the present prospects of increase of mineral, several more will soon be needed. The mineral is very rich, yielding a general average all around of from sixty-six to seventy-five per cent. of the best quality of soft lead, fully equal to what is known as "the best Missouri soft," that being softer than the "best Galena soft."

PRODUCTIONS.

The soil and climate of Jasper county are favorable to the production of most of the grasses, fruits, vegetables and cereals known to this continent, but it is only necessary to report upon those which are more particularly adapted to this region and cultivated in this county.

The grasses do well here; this is eminently a grass growing region. The wild grass is of fine texture and very nutritious, but it is

well known that wild grass can not bear cultivation and civilization; it is fast vanishing away before the plow and the close feeding and much tramping of stock, and its place on the common is being supplied by a spontaneous growth of Kentucky Blue Grass. Several loads of very excellent timothy hay, the first in this market, were on the streets of Carthage during the past summer, 1871.

FRUITS.

The value of Jasper county for the production of fruit, is proved by the abundance and variety of her wild fruits, and by the productions of the remnants of orchards which survived the war, as well as by the numerous gardens and patches of small fruits which have been cultivated since the re-settlement of the county.

There are numbers of orchards, or parts of orchards, principally apple, that are from ten to twenty-five years old, and are remarkable for smoothness and cleanness of bark and limb; there are several of these orchards that each yield from 1,500 to 3,000 bushels of apples every year, and are a wonderful assistance and encouragement to the hundreds who are now planting and cultivating young orchards. An orchard is among the first improvements of our new settler, and the great number and choice assortment of young orchards in this county is an indication of the enterprising character of our farmers.

Grapes are beginning to be cultivated quite extensively, there being several vineyards in the county besides the few vines cultivated by almost every farmer. It is not yet proved what varieties will take the lead; all the principal ones are cultivated; this being such a natural grape country, we expect their cultivation will soon become a matter of much importance. The grape crop this year was three-quarters cut off by a late freeze in the spring, which also injured the apple and pear crop, and almost totally destroyed the peaches, quinces, plums, apricots and nectarines.

The peach crop in Jasper county has thus far proved rather uncertain, there being two almost total failures in five years. The rapid growth of the peach wood is remarkable, but there seems to be so much open weather during the latter part of the winter, that the peach-buds swell, and then a little late freeze does the business. Yet the old settlers assure us that previous to the war they had but three total failures of the peach crop during twenty-two years.

VEGETABLES.

All the common garden and field vegetables are successfully cultivated in Jasper county, and all yield well; there never is, or never need be, a failure, while every season we see or hear of extraordinary productions. Probably the most important vegetable productions are Irish and sweet potatoes, and yams; they grow large, are of good quality and yield well.

CEREALS, ETC.

This is a grain growing county. The "red soil" or "mulatto soil" is peculiarly adapted to the production of wheat, and a fair crop can always be expected. The winter wheat of this county is a very superior article, making a better grade of flour than is found in any other country with which I am familiar, except California, and is nearly equal to the beautiful flour from the plump white wheat of that golden State.

The average of wheat per acre this year, 1871, in some townships, as shown by the threshers' report, does not exceed twelve bushels, while in others it went twenty. A few fields were a total failure from the "fly" and "chinch bug," while a few fields went as high as thirty bushels per acre.

The wheat crop this year did not average per acre quite up to 1870, but there was three or four times as much sown.

The corn crop of Jasper county, this year, was immense — much greater than in 1870; but owing to the large amount of sod corn planted, which, of course, is not expected to make a large crop, the average yield will probably not be over 35 or 40 bushels per acre. The largest yield of corn this season was the five acres of premium corn of Col. J. D. Allen, which measured 115 bushels per acre. [See list of premiums awarded.]

Rye has not yet been much raised.

Barley has not been raised to any great extent; a few fields this year went 45 bushels to the acre.

Oats are a staple crop; not so good this year as last; the average is about 25 bushels per acre. The Norway and Surprise oats are raised quite extensively.

Hemp does well, but is raised only in small patches.

Tobacco does well here, but no very large amount has yet been grown.

Castor beans make a fine growth; not many raised at present. In two or three instances this season, they yielded at the rate of 25 bushels per acre.

Broom corn does well; better this season than in 1870.

Sorghum is one of the staple productions, is extensively cultivated, and yields well; we have several sorghum mills and evaporating pans of the various improved patterns, and all seem to be busy manufacturing syrup—some of which is a very superior article — as long as the season lasts, and then finish off after frost, with a few tons of cane gathered before frost came.

Flax, buckwheat and beans do well, but are not cultivated except in patches. I have not been able to get any figures. The

LIVE STOCK

Business is now carried on to a considerable extent in this county, and is destined soon to become a leading branch of business. The combination of advantages in that business here can scarcely be found elsewhere; plenty of good water, the wild grass of the prairie is excellent, and comes early, our seasons being about three weeks in advance of the latitude of Keokuk, Iowa, and the grass does not entirely dry up or spoil by frosts of winter until very late; there is some grass and vines in the bottoms, and timber that will furnish subsistence for stock all winter. I have seen horses and cattle that have wintered through with no other food; but their appearance in the spring was very poor evidence in favor of that kind of treatment. But the winters being short, much less feeding is necessary than at the north. These advantages have been so apparent that almost every settler in Jasper county seems to have made up his mind to try the stock business more or less.

There is a growing popular feeling in favor of improved breeds of stock, and some are making a business of it. Short-horn Durhams take the lead.

The many fine teams of horses and mules everywhere seen in Jasper county, proves the general interest taken in that kind of stock. Our farmers seem to prefer the large draft horse.

Sheep do well here, attaining the greatest perfection in their fleeces, and the time is not far distant when the hillsides of our manufacturing streams will be teeming with the flocks that will furnish the wool to feed the scores of factories which will send Jasper county cloth to the markets of the world. Besides the number of sheep reported in the assessor's list, we have a few lots of the finest graded Merino stock.

But the most marked improvement in stock in this county, is seen in the swine. Our county is now literally stocked with good hogs; poor hogs are the exception. Berkshires take the lead; Poland and China next, and Chester Whites third — then follow the grades and crosses.

EXPORTS.

The principal articles of export at the present time are, flour, wheat, wool and pork. The wheat, wool and pork mostly goes east and north; the flour finds the best market west and south—Jasper county brands commanding a better price than any others.

Cattle are an article of both import and export — being brought here in droves from the south-west, generally very poor, are kept over winter, fattened up, and sent to a northern market.

The permanent character of the improvements, and the cultivation of the natural resources, thus far, indicate much of the enterprising character of the

INHABITANTS

Of Jasper county; but it is a matter of particular notice that our citizens are so thoroughly American. It would be hard to find the same number of people anywhere else with so few foreigners, and those few of the more enterprising class. The reason of so few being here is probably owing to the fact, that the mass of foreigners follow railroad lines and navigable streams, while it takes the sturdy American pioneer to stage and wagon a hundred and forty miles in advance of railroads.

Our settlers are principally the better class of farmers from Illinois, Iowa, Ohio, Indiana, Wisconsin, Michigan and New York, who came to Jasper county for better climate, more land for the boys, etc., and are rather exceptional for their industrial and educational proclivities.

Churches and school-houses are in advance of other improvements, the latter especially being frequent and commodious enough to do credit to a much older settled country.

THE THIRD ANNUAL FAIR

Of the Jasper County Stock and Agricultural Association, was held on their grounds the 10th, 11th and 12th of October, 1871, and was, in many respects, an improvement on previous fairs, but was not equal to our desires, nor to what it could and should have been. Our farmers and mechanics have not yet taken hold of this institution and made it their own, so that instead of being really a county society, it is only the efforts and struggles of a few individuals to make a county society. Much was said and published in our county papers to induce a general interest in and patronage of our fair; the result was apparent only in an increased attendance, and not in that pride to assist in making the fair a success, which is so desirable. Every farmer and mechanic in the county ought to be a member of our association; but instead of that, we have but 170 persons to comprise the whole of the Jasper County Stock and Agricultural Association.

It will be seen by a previous report, that our fair grounds consist of forty-eight acres, beautifully situated on the north bank of Spring River, one mile north-west of Carthage, which has been improved since last year by a tight board fence, seven feet high, and some additional stock pens.

The most successful feature of our last fair was the great display of swine, showing the most marked improvement over our previous fairs, both in numbers and grade, and would have done credit to any State fair. There were fifty-six entries in this department, and all were of superior grades—Berkshires, Poland-Chinas and Chester Whites.

The horse and cattle departments were well represented—a very little improvement upon last year.

There were but few sheep exhibited. They were of fine grade, but the number on exhibition was much less than last year.

There were but few entries of poultry, mostly Light Bramahs; a very little improvement upon last year.

The display of agricultural implements was not equal to that of last year.

The display of farm and garden products was a very marked improvement upon that of last year, and yet it was not equal to what Jasper county ought to have done or could have done.

The kitchen and dairy department was almost wholly neglected, not making as good a show as the poor show of last year.

The display of fruits, jellies, preserves, etc., was not equal to last year.

The domestic arts and fine arts departments were poorly represented. There were many good and fine articles, but the display was very small in comparison with that of last year. There seemed to be two reasons why these two last departments were so poorly filled, one was, the premiums had been reduced from last year, and the other was that the art gallery was nothing but a poor shanty, and could not keep out rain, thus endangering whatever was placed there for exhibition. A good art gallery is one of the most needed improvements on the fair grounds, and we expect to have it before our next fair.

The following articles are worthy of particular mention: A very fine display of cloths and five-pound bunches of yarn, of white and assorted colors, manufactured by Wm. Myers & Son, at their woolen factory in Carthage, and the beautiful evergreens and fruit trees from the Jasper County Nursery, John C. Teas, proprietor.

The Climax reaper and mower took the premium; also the Howe sewing machine, the Dashaway washing machine and the Moline Plow Company's walking cultivator.

This same cultivator, valued at thirty-five dollars; was offered by the Moline Plow Company as a premium for the best five acres of corn in Jasper county. Our General Agent, Major A. J. Bahney, published a call in every issue of our two county papers, for a few weeks before the fair, for entries to be made to compete for this prize. There were twelve entries made, and it is no disgrace to those who were beaten, to publish the whole list.

John Elliott,	5 acres, averaged	75 bu.	per acre.
J. A. Loop,	5 "	85	"
J. K. Gibson,	5 "	113½	"
J. K. Gibson,	20 "	100	"
John D. Allen,	5 "	115	"
John D. Allen,	24 "	110	"
John W. Gray,	5 "	75	"
John W. Gray,	40 "	70	"
William Kelsey,	5 "	75	"
William Kelsey,	20 "	70	"

George Wolf,	5	acres, averaged	70	bu. per acre.
F. McGuire,	5	"	86	"
R. Morris,	5	"	107	"
R. Morris,	30	"	107	"
J. C. Pitts,	5	"	95	"
J. C. Pitts,	40	"	80	"
David Felton,	5	"	81	"
David Felton,	12	"	75	"
Wm. Collings,	5	"	80	"
Wm. Collings,	75	"	75	"

Each of the above pieces of ground were measured, and then a small square of average hills taken, the corn gathered, shelled and measured by a committee of three disinterested persons, viz: Judge John Onstott, W. H. Rusk and Jonathan Rusk; they were three or four days making the measurements.

The annual address was delivered on the fair ground, on the last day of the fair, by Chas. W. Murtfeldt, of St. Louis, who, in a very efficient manner, presented some instructive facts relating to fairs in general, and Jasper county fair in particular.

The receipts of the fair were $1,149.50—a slight increase over last year.

There were premiums paid amounting to about $850, and for improvement of grounds, and other expenses during the year, there was paid out about $1,200.

During the year there was paid, on account of balance due for purchase of grounds, $1,054. The total receipts during the year were about $1,300; the total expenditures during the year were about $3,100, which is not a very flattering condition of things to commence a new year.

Our official board is the same as in my last report; the annual election takes place the first week in January.

JEFFERSON.—H. ESHBAUGH.

1. The leading staples of our county are, corn, wheat and cattle

2. The commodities most exported are, in order of their importance, first, wheat; second, cattle; third, pork.

3. The crops of 1871 were ten per cent. below those of the year previous, in consequence of drouth.

4. The estimated average yield per acre of crops in this county for 1871, is as follows:

Wheat, ten bushels.

Corn, thirty-five bushels.

Oats, twelve bushels.

Barley, fourteen bushels.

Hemp, one and one-half tons.
Tobacco, one thousand pounds.
Castor beans, twelve bushels.
Potatoes (Irish), forty bushels.
Potatoes (sweet), forty bushels.
Turnips, one hundred and fifty bushels.

5. The increase in cattle is about ten per cent.; in horses and mules, two per cent.

6. The nearest point to a railroad from our county seat, is Victoria.

7. The Mississippi river is on the eastern portion of the county.

8. Our ultimate Western market seems to be St. Louis, which is, however, situated north of us.

Some immigration during last year.

LINN.—D. C. STRAWBRIDGE.

In answer to your interrogations, I give the following:

Our leading agricultural staples are wheat, corn, oats, tobacco and potatoes.

We export, most, corn; second, wheat; third, tobacco.

Crops of 1871 (except oats) are much better than 1870; in fact, better than for many years.

The average yield for last year was as follows:

Wheat, twenty bushels.
Corn, forty bushels.
Oats, thirty bushels.
Irish potatoes, one hundred and twenty-five bushels.
Sweet potatoes, one hundred and twenty-five to one hundred and seventy-five bushels.
Tobacco, from eight hundred to eight hundred and fifty pounds.

Other crops enumerated in fourth inquiry of circular, will average well with those of the best counties in the State.

Considerable increase in domestic animals of all kinds.

There is a railroad now building through Brookfield, the county seat.

The ultimate* Western market for our produce is St. Louis.

I can give nothing strictly reliable in regard to immigration into our county, except that it has been large for four or five years. At

---

*There is evidently a wide diversity of opinion on the part of correspondents as to the meaning of the term "*ultimate Western* market," used by Mr. Murtfeldt in the eighth interrogatory of his circular. I do not profess to understand the exact "object lesson" sought to be conveyed by these words myself. J. F. W.

present the prospects are not so good, as immigration appears to be going further West.

Our county is in a healthy condition, very well settled, and being well improved.

LIVINGSTON—Hon. Robt. S. Moore.

The leading agricultural productions of Livingston county are wheat, corn, rye, oats, hay and potatoes.

Wheat is most exported—corn second—oats third.

The crops of 1871 are above an average.

The yield of wheat is estimated at 15 bushels; corn, 40 bushels, oats, 30 bushels; rye, 20 bushels.

There is an increase in stock of all kinds.

There are two railroads running through Livingston county, one from east to west, the other from southeast to northwest. No other facilities for transportation. Our markets are Chicago and St. Louis.

Immigration for the past season has been very light.

The Keokuk and Lexington railroad is now built through the county, and will be completed next year. A railroad is also being built from Chillicothe to Trenton, Grundy county, which is now graded, and will be ironed and running next spring.

MACON.

1. The leading agricultural staples of our county are tobacco, corn, wheat and potatoes.

2. The principal commodity we export is tobacco; next in importance comes wheat.

3. The crops of 1871 much surpass those grown heretofore.

4. The estimated yield of wheat is 18 bushels; corn, 40; oats, 15; rye, 20; Irish potatoes, 75 bushels; sweet potatoes, 100 bushels.

5. There is a large increase in stock of all kinds.

6–7. Two railroads cross the county.

8. Question.—Where is the ultimate *Western* market for your produce?

Answer.—Hard to tell!

There has been a very fair amount of immigration coming into our county.

MARION—Hon. Geo. H. Shields.

After some trouble in finding out the answer to your questions, I have the honor to reply the following:

The leading staples of Marion county are corn, wheat, beef, pork, and fruit.

The commodities we export the most are wheat, beef and pork, in the order named; corn is fed on the farm.

The crops of 1871 show an increase of from ten to thirty per cent. over those of 1870.

Wheat on best clovered land averaged 20 bushels; the highest yield, 27 bushels; corn, 50 bushels; oats very light; Irish potatoes, 70 bushels, (affected by the drouth.)

Swine increased 30 per cent. (No statement made as to other domestic animals.—Ed.)

Hannibal and St. Joe. Railroad runs through county and county seat.

Eastern railroad connections, and north and south by Upper Mississippi.

I can give no reliable information in answer to questions eight and nine.

McDONALD — Hon. J. C. Lamson.

Our leading staples are wheat, corn, oats and potatoes. Corn is most exported.

Corn and oats averaged about the same as last year. Wheat and potatoes were a failure in 1871.

The estimated yield of wheat per acre is — bushels; corn, twenty-five; oats, twenty.

There is an increase in cattle, horses, mules sheep, and swine.

We have no other facilities of transportation besides the Atlantic and Pacific Railroad, which runs through Neosho, the county seat.

The ultimate Western market for our produce, is the Cherokee Nation l

Immigration into our county has been very light during the past year.

MISSISSIPPI — Geo. Whitcomb.

1. Our principal staple is corn. We also grow wheat, hay, potatoes, oats, castor beans, broom-corn.

2. Our chief exports consist of corn, wheat and potatoes, in the order named.

3. Crop of 1871 much better than that of the year previous—an increase of, say, twenty-five per cent.

4. Corn yields with us from forty to eighty bushels—with extra care, sometimes one hundred bushels per acre; seventy bushels is a rather large crop, with common culture. The yield of wheat varies from twenty to thirty, and sometimes forty bushels an acre. Oats, from fifteen to twenty. Some seasons four hundred and even six hundred bushels of Irish potatoes are grown on one acre, while at other times the yield may not exceed two hundred. The early rose has been known to produce fully five hundred bushels to to the acre.

5. The increase in cattle and horses is about ten per cent.; in hogs, about twenty per cent.—judging from assessor's books.

6 and 7. St. Louis and Iron Mountain Railroad runs through the county. The Mississippi river nearly surrounds the county.

8. Question.—Where is the *ultimate Western* market for your produce? Answer.—*Alaska*, probably!

Immigration is not large, although we have plenty of room and fine lands. The following is a

DESCRIPTION

of the county:

Mississippi county is situated in latitude 36° 40′ to 37°, opposite the mouth of the Ohio river, and containing about 260,000 acres of land, most of which is susceptible of cultivation, and is a rich, alluvial soil, called, in Western parlance, "river bottom," a soil fully as productive as the Delta of ancient Egypt.

Owing to the peninsular shape of the county, being nearly surrounded by the river, with a large water course (James Bayou) running through its center, having as much fall in twenty-one miles as the river has in seventy-five, it is susceptible of being drained at a trifling expense.

Being entirely "river bottom," of course there are no hills in the county, unless some hundred "Indian mounds" are entitled to that appellation, nor a rock of any considerable size; but clay is abundant from which brick can be made, and with the superabundance of timber, the want of rock is little felt.

Most of the county is yet heavily timbered, the predominant growth being cottonwood, black walnut, black and honey locust, white, red, black, over-cup, chincapin and post oak, sugar-tree, hickory, maple, mulberry, coffeenut, sweet and black gum, persimmon, pawpaw, dogwood, etc., and upon the water courses are immense brakes or groves of cypress, a timber equal to pine for building purposes, and superior to it for out-door work, such as weather-boarding, shingles, fencing, railroad ties and piling.

There are three small prairies in the county, "Mathews' Prairie," in township 26, range 16; "Long Prairie," in township 26, range 15; and "East Prairie," in township 25, range 15; averaging from four to

six square miles each, occasionally interspersed with small groves of timber.

Corn is the staple crop, yielding from forty to one hundred bushels per acre, without manure, or other cultivation than by the plow. Wheat, barley, oats and rye, do well; so do sorghum, castor beans, tobacco, timothy and the coarser grasses; cotton does well for the latitude, producing from four hundred to five hundred pounds to the acre.

Garden vegetables attain a size that would be deemed fabulous in the hills or under a more northern clime; potatoes, turnips and other root-crops grow fine, and yield largely, as also do pumpkins, melons, beans, peas, and other leguminous vegetables. Apples, pears, quinces, and plums do well, and it is the special home of the peach and the smaller fruits, such as currants, gooseberries, raspberries and strawberries.

Southern Illinois furnishes St. Louis and Chicago with early fruits and vegetables, so much so that the Illinois Central, and other roads, run quick trains expressly to carry them, and the trade is rapidly increasing.

Southern Illinois, except a small portion about Cairo, is a hilly country, with a cold, clayish soil, and the same may be said of Southeastern Missouri, after passing out of the bottom lands; while our warm, rich sandy soil, a degree of latitude south of most of the Illinois lands, and half that much in altitude, makes our season from two to four weeks earlier than that of Illinois, a matter of vital importance to the gardener and market farmer.

Another advantage: Marketing can be put in St. Louis in nine hours, (180 miles,) delivered near the markets, with little hauling and and no transfer of cars, thus enabling vegetables or fruit to go there late in the day and be in market the next morning; while from Southern Illinois there is a change of roads, crossing the ferry and hauling in wagons, taking much more time and damaging the article, particularly the softer and delicate fruits.

Southward is the Mississippi River, bordering the county for seventy miles, which never blocks with ice or goes dry below Belmont, with railroads running from Columbus, Ky., (opposite Belmont) to Nashville, Mobile and New Orleans and all the cotton and sugar growing States, furnishing a ready market for beef, pork, corn and other productions of the county.

The St. Louis and Iron Mountain Railroad runs through the northern half center of the county, to Belmont on the Mississippi River, passing through the vast mineral country in the vicinity of the Iron Mountain, soon to become a great manufacturing district, which must draw its supplies of provisions, except, perhaps, flour, from the rich lands further south, making a market almost at our own doors.

The Cairo and Fulton road runs from Bird Point (opposite Cairo,) south-westerly through the county, intersecting the Iron Mountain

road at Charleston, and will, when finished, extend through Arkansas and Texas to the Pacific ocean. Belmont, the terminus of the Iron Mountain road, has a fine landing, and the best and shortest crossing on the river from St. Louis to New Orleans, which fact, and contemplated connection with the Iron Mountain, caused the Mobile and Ohio road to terminate at Columbus, working it practically a Mobile and Mississippi road.

Charleston, the county seat, is situated in Mathews' Prairie at the junction of the two railroads; has a fine hotel, two churches, two steam grist mills, merchants, mechanics, and tradesmen as usual, a fine masonic hall and a printing office, from which issues the "Charleston Courier."

With a mild climate, where snow is almost unknown, a warm rich soil easily worked, equal to any for early and large crops, lands cheap and markets convenient, it certainly offers superior inducements to those who wish to escape the cold winters of the North, have good and cheap land, and still keep within the bounds of civilization.

MONITEAU—Hon. John B. Haas.

Moniteau is, in fact, the central county of Missouri; it presents a great variety of soils, and is rich in all the elements of material wealth. With the exception of bottoms, our lands are generally thin, and best adapted to the culture of wheat, oats and other small grains. Corn, however, is raised to a considerable extent on the prairie lands, and large crops of this staple are grown in the several creek-bottoms.

The county is watered by the Petite Saline, Moreau and Moniteau Creeks, which afford an abundance of water the year round. Prairies and forests are divided in nearly equal proportions; the timber, which comprizes the different varieties of oak, hickory, walnut, elm, hackberry, ash and wild cherry, is within convenient distance of nearly every farm.

The different grasses succeed as well here as in other parts of the State; and timothy, clover and Hungarian grass are largely cultivated for hay and pasturing purposes.

Of late, several dairies have been started, which manufacture a very good quality of imitation Swiss cheese, mostly for exportation to St. Louis, and carry on a profitable business.

Fruit-growing is also receiving a considerable share of attention, and the dried fruits of our county always command a high price, and find a ready sale. The only difficulty in the way of shipping green fruit, has been heretofore the distance from large markets. Many orchards of the finer sorts have been planted recently, and several local nurseries supply the demand for young trees.

Grape growing is yet in its infancy, although a number of vineyards have been planted recently, and good judges of this branch of industry agree in saying that from the dry and rolling nature of a portion of the county, Moniteau is equally as well adapted to grape-growing as any other county in our State.

A considerable amount of flaxseed and tobacco are raised—the latter of a superior quality.

Sorghum is very generally cultivated; in fact, hardly a farmer can be found in our county who does not grow a patch of it for home use. Some attempts have been made to grow the sugar beet, but either from a want of knowledge of its culture, or from some other cause, these experiments have not met with the desired success.

The low prices obtained, of late years, for corn and wheat, have given a new impetus to the raising of all kinds of stock. More attention has been paid to the improved breeds of hogs — numbers of our farmers having gone to considerable expense in importing valuable Berkshires and Chester Whites. We may, therefore, in future, reasonably expect larger and heavier animals, and better pork and bacon. The wise conclusion is being at last arrived at, that it costs no more to feed and fatten good animals, than it does to keep up poor ones.

Sheep raising, also, would form a material source of wealth for our agriculturists, were it not for the large number of worthless cur-dogs, who are allowed to range at large and destroy our sheep. This constant source of annoyance, alone, has hitherto prevented many farmers from engaging in this lucrative branch of husbandry. As soon as laws are enacted that will put a stop to the depredations of dogs, Moniteau county will produce mutton and wool largely in excess of her own consumption.

The honey-bee is receiving a due share of attention; thus far it has met with good success, and has been the source of considerable revenue.

There can be no reasonable doubt that Moniteau county is rich in valuable minerals. Sufficient prospecting has already been done to establish the fact that an abundance of lead exists, and one or two furnaces have been built, and are now in operation in the southern and south-eastern portion of the county. Several mines of an excellent quality of cannel-coal are now being worked, and bituminous coal, of a good quality, has been discovered in several places, silently waiting for the sturdy hand of labor and the golden key of capital to open and develop its hidden riches.

The spirit of improvement is aroused, and last year two substantial bridges have been built over the Moreau and the Moniteau—two creeks that are often unfordable. Good roads—so indispensable to the welfare of the farmer—will, it is hoped, follow the building of

the bridges, so that the most distant farm in the county can be accessible to a market.

Some portions of this county are in need of a permanent supply of water, and this could be furnished by means of a canal, or an aqueduct.

MONROE—JOHN MAGEE.

The following is the agricultural status of our county, probably correct in the main, and obtained mostly by inquiry.

The leading agricultural staples of Monroe county are cattle, horses, mules, hogs, and tobacco.

The commodities most exported are cattle, hogs, tobacco, in order as named.

The crops of 1871 compare favorably with those of former years.

Wheat is estimated to yield 10 bushels per acre; corn, 30 bushels; rye, 10 bushels; oats, 30 bushels; tobacco, 800 pounds.

There is a small increase in all domestic animals except sheep.

The nearest point to a railroad from Paris, our county seat, is Shelbina, Shelby county—the Moberly Railroad, now being built, will pass through Paris. No other facilities for transportation.

Immigration for last year was light.

The *ultimate Western* market for our produce is St. Louis.

NEW MADRID—JOHN T. SCOTT.

Your circular of the 7th August, was handed me by Hon. F. C. Butler, our Representative, only a day or two since, for answer.

The leading agricultural staples of our county are corn, castor-beans and cotton. Corn, however, is the leading staple. The corn exported here is worth twice or three times as much as all the rest of our exports together.

The castor beans are next in importance. This article has grown into importance within the last few years.

Cotton may be said to be third in importance. The season here, is too short, however, rendering it too uncertain a crop, else it would probably be the first in importance.

We annually ship more or less sweet and Irish potatoes, but not enough to entitle either of them to the appellation of a staple commodity. We also ship a few apples.

The corn crop for the present year is much the best we have gathered for years, and compares well with the crops of the last few years next preceding the war.

The estimated average yield of corn is 35 bushels per acre; castor beans, 10 bushels; cotton, three-quarters of a bale; wheat, 18 bushels, and oats, 25.

Oats, rye, barley, hemp, tobacco, broom-corn, flaxseed, buckwheat and white beans grow well and yield largely, and are certain crops almost every year, but none of them are in any sense staples, and some of them, for instance, hemp, tobacco, barley, buckwheat and white beans are never grown as a crop.

During the war our county was almost entirely depleted of horses, mules, cattle, sheep and swine. Since 1865, these have increased at least a hundred fold. Several hundred head of horses and mules have been imported for farming purposes.

Morley, on the St. Louis and Iron Mountain Railroad, in Scott county, is the nearest point to a railroad in operation. There is a company organized, who contemplate building a railroad from Morley, in Scott county, by the way of New Madrid down the west bank of the Mississippi river to Memphis. This road will probably be put in operation the coming year. Should such be the case, New Madrid county, owing to her warm, rich, alluvial soil, will shortly become the *garden* for St. Louis. This is as certain as that effect follows cause. We must wait, however, for time and tide. It is thirty-two miles from here to Morley.

We have other facilities for transportation. The greatest length of New Madrid county lies on the Mississippi river, which, southwardly, is a never-failing *ingress* and *egress* to all our transportation. From here to Cairo, Louisville, St. Louis, and other places east and north of us, the "drouth of summer and the frosts of winter" often obstruct, for months at a time, the navigation of this great river, to such an extent that we can transport but little produce and that, too, at enormous cost. This will, to a great extent, be remedied as soon as the St. Louis and Memphis Branch Railroad, the road above referred to, is completed.

Our produce is shipped mostly to New Orleans. Considerable quantities of corn are now being shipped to Memphis and Vicksburg.

We have very little immigration to this county. Our lands are too high. Immigrants generally seek cheap lands, and follow the railroads.

I am sorry your circular was not handed me a month ago. It would would have been with great pleasure that I would have taken pains and written you a good article, giving statistics, data, etc., etc.

NEW MADRID—J. NEUBAUER.

Your circular inquiring about the agricultural *status* of this county is received. I wish to answer questions in the same order as proposed, but as this part of the State is but very little known abroad, I prefer to begin by giving information not provoked by your interrogatories, in order to furnish you with details that will facilitate a proper arrangement of the subject-matter. The Mississippi River, which forms our eastern boundary, bends in a south-eastern direction below Cape Girardeau, making the distance to New Madrid, the county seat, nearly double by water that it is by land, and with the exception of a few fields and clearings appearing in sight here and there, the traveler who views the country from the deck of a steamboat is apt to derive the impression that it is all a wilderness, subject to periodical overflow.

A large body of valuable timber, and enough of the richest alluvial lands to locate at least one thousand fine farms, are inaccessible for all practical purposes on account of overflow. If, instead of donating this class of lands to the State as swamp lands, the General Government had originated and kept up a practical system of dikes and levees, the sections subject to overflow could have been nearly all redeemed, and the price derived from the sale of the land would have probably reimbursed the United States for the expense incurred.

The western portion of the county is known under the name of the "Little River Swamp" region, and is believed to be land sunk during the earthquake of 1811. Little River is a very crooked stream, and is sometimes navigated by small steamers at high water as high as Dunklin county. Even to this day, the swamps of this region are the abode of trappers and hunters. Besides deer, elk and a few bears occasionally, horses and hogs have become wild and have multiplied to some extent—cane and swamp grass growing in abundance for their support during winter.

The farms in the county are mainly located on a ridge averaging three or four miles in width, and extending through the county in a north and south direction. The overflowed land is the richest, and might easily be made to produce from sixty to one hundred bushels of corn per acre.

Our leading staples are corn, castor beans, cotton, wheat and oats.

The commodity mostly exported is corn; second, castor beans; third, cotton. With the exception of castor beans, crops compare favorably with the crops of former years. No wheat worth speaking of was sown last year. The scarcity of hands during harvest, when other crops need cultivation most, makes it inconvenient for our farms to grow wheat. Corn yielded from thirty to fifty bushels, some receiving very little rain during the growing season. Castor beans were damaged by worms preying upon the spikes, many fields being hardly

worth gathering. Fields that escaped damage to a great extent may have averaged from twelve to fifteen bushels per acre; but I do not think a single field was entirely free from the depredations of the worms. The production of castor beans has exceeded the demand this year, and owing to the low prices now prevailing, it is doubtful whether castor beans will again be raised to any extent here for years to come.

Cotton averaged last year one bale to the acre; in less favorable seasons it averages two-thirds of a bale.

It looks well this year, and would be more extensively planted, were it not for the difficulty of procuring hands during the picking season.

Sweet potatoes succeed admirably, but are not planted in any quantity for export; Irish potatoes are more uncertain, although the bugs have not made their appearance here as yet.

There is no increase in stock, most of the land being occupied by renters. If it belonged to farmers who owned their own places, stock-raising could be made to yield large profits.

The nearest railroad point is Morley, on the St. Louis and Southern Railroad. Most freight is shipped on the Mississippi River—corn and cattle to New Orleans, and cotton, wheat and castor beans to St. Louis. It is difficult to say where our *ultimate western* market will be. Very little immigration comes into our county; the prevailing impression that we live among swamps, instead of being settled on a fine, rich second bottom, situated above high water mark, as we are, prevents settlers from coming among us, who often pay $50 or $100 per acre elsewhere for land less productive and less favorably situated.

NODAWAY—Hon. M. B. W. Harmon.

Nodaway county contains 559,051 acres, valued at $3,899,084, and 1,368 town lots, valued at $245,405; the personal property is valued at $1,356,843. Total valuation for revenue purposes, $5,501,332.

The county is well watered, with sufficient timber for all practical purposes. The soil is a rich, black loam, with surface gently undulating, and there is very little land in the county that is not susceptible of being improved.

We had in the county, in 1870, 9,595 horses, 1,072 mules, 31,306 cattle, 16,894 sheep, and 44,950 hogs. Total estimated value of live stock, $1,538,000.

There were raised in Nodaway county, 43,600 bushels spring wheat averaging 12 bushels per acre; 8,000 bushels winter wheat, averaging 20 bushels; 2,550 bushels rye, averaging 20 bushels; 1,351,420 bushels

corn, averaging 40 bushels; 169,836 bushels oats, averaging 35 bushels; 1,500 bushels barley, averaging 25 bushels; 114,876 bushels potatoes, averaging 70 bushels; 12,000 bushels apples, 46,000 pounds wool, 259,140 pounds butter, 15,000 pounds cheese, 18,859 tons hay—average of timothy and clover hay per acre, 2 tons; 15,244 gallons sorghum molasses, and 5,080 pounds honey. Estimated value of farm products, $1,530,000. These data are gathered from reliable sources for the year 1870.

Although Nodaway is one of the largest as well as most fertile counties in the State, with a remarkably healthy climate, and an abundance of pure water, it has a population of 16,000 only, which is being increased by immigration—mostly from the middle States and Germany—at the rate of from 1,000 to 1,500 per annum.

The increase in horses, mules, hogs and cattle is comparatively much greater than the increase in population; but sheep, having suffered from scab and foot-rot, have decreased, in 1871, some 2,000 head.

Spring wheat was almost entirely destroyed by chinch bugs; but all other crops are better than in 1870, or any previous year recorded.

Unimproved lands are rapidly selling at from five to ten dollars per acre.

Nodaway county already has one railroad completed, viz: the Missouri Valley Railroad—with two more in contemplation.

There are annually exported some 30,000 hogs, most of which are packed in St. Joseph, and from 5,000 to 6,000 head of fat cattle, most of which are sold in Chicago.

This county produces all the cultivated grapes which grow in the older States, in as much perfection as any of them. As the prairie grass is trampled out by stock, blue grass and white clover take its place—so that we have a locality almost unequaled for grazing or dairy purposes.

Coal is known to exist at several points in the county, but has not yet been extensively mined.

A quarry of the finest sand-stone for building purposes, as well as numerous beds of lime-stone, also exist.

P. S.—Any further information can be had of A. J. Morehouse, President Nodaway Agricultural Association.

OSAGE—J. K. KIDD.

Osage county is situated in the interior of the State, and is bounded on the north by the Missouri River, west by the Osage River, south by the counties of Miller and Maries, and east by Gasconade county.

It is a well-watered region, because, in addition to the rivers mentions, the Gasconade River runs through a portion of the county, Maries, L'Ours, Third, Bailey's, Deer, Contrary, Caddy, Swan, Owen's, Mistaken, Sugar and other creeks flow through the territory comprising the county.

The surface is hilly and broken by bluffs contiguous to the water courses. There is some as good land in this county as there is any where in the State. The bottom lands are extremely fertile, while a great portion of the hilly land is very far from being unproductive, or unremunerative to the cultivator.

Springs of pure and wholesome water are abundant all over the county.

Westphalia is the largest town in the county, and is emphatically a German town. Rich Fountain, in the same township, is also a German town, and the same may be said of L'Ours or Loose Creek. All three of these towns have a Catholic Church and regular services. Koeltztown is also a German town, and has its church and priest.

Linn, situated in the central part of the county, and on the State road leading from Jefferson City to St. Louis, is the county town.

Dauphin, in the north-west part of the county, is situated on the Pacific Railroad, and is quite a shipping point. This place is better known as Bonnot's Mill, and is, as the name indicates, a French town.

Medora and Chamois are in the northern portion of the county, and are located on the above mentioned railroad.

The town of Castle Rock is quite a shipping point on the Osage River.

In addition to the above towns, the following postoffices are located in the county: Berger's Store, Fredericksburg, Mint Hill, Byron, Galloway's Station, Cooper's Hill, Providence, Peach Land, Edward's Mill and Linnwood.

There are ten steam, saw and grist mills in the county; also one water mill, saw and grist; two carding; machines and other mills in process of construction.

Timber is abundant and good, and consists of white and black walnut, cottonwood, hickory, hackberry, elm, maple, sycamore, ash, cedar, box elder, and several varieties of the oak.

There are many sorts of wild fruit growing in the valleys and on the hills, and among them I will mention the crab apple, plum, cherry, haws, persimmons; also the service, goose, whortle, straw, rasp, black, and dewberries, and any number of varieties of the wild grape.

Flora's kingdom is well represented by various perennials, biennials and annuals; also by wild roses and many flowering shrubs, among which the red bud is the most conspicuous.

There is an abundance of iron in this county, for the surface indication are to be seen in numerous localities. Limestone of various qualities is abundant; also sandstone, quartz, chert, etc.

There are indications of copper, and lead has been found in the county. No coal has, as far as I know, been discovered yet.

Corn is the principal crop, and fails seldom.

Wheat is next in importance to the farmer, and is cultivated extensively on the hill farms.

Oats do well; the same may be said of rye, barley and buckwheat, but these grains are not cultivated very extensively.

A better fruit country is not to be found. The grape flourishes, and wine of a superior quality is made.

Peaches on the highlands scarcely ever "miss."

Apples, pears, plums and quinces grow excellently.

It is a good county for raising hogs, as there is so much wild fruit, in addition to the nuts and acorns; but hogs can not very well exist the year round without some feeding.

Deer, turkeys, raccoons, etc., are hunted for food or fur, and are quite often captured.

The waters abound in fish of numberless varieties, from the great catfish of the Missouri down to the little minnow of the brook.

In Osage county there are 374,336 acres of land. Of that quantity 356,217 acres are on the assessor's books. This land can be bought at prices ranging from one dollar to one hundred dollars per acre—location and nearness to market regulating the price.

The assessment of 1871 shows that there were 3,540 horses; 1,456 mules; 10,704 head of neat cattle; 10,159 sheep; and 27,608 hogs in the county.

Population in 1870: 10,793.

Nearly every religious sect is represented in the county, and places of worship are numerous, if they are not elegant. The county is divided into about sixty-five school districts, and nearly every district has a school-house, in which school is taught a portion of the year, ranging from three to eight months.

OZARK—Wm. H. Norris.

Crops are not as good this year as they were in 1870.

Corn, wheat, rye and oats are the leading agriculture staples.

Tobacco, potatoes, buckwheat, beans, and many other cultivated plants grow to perfection in our soil and climate. I am not, however, prepared to give a correct estimate of the yield of each per acre.

This section of the country is particularly well adapted to stock-growing, as there is a large amount of uninclosed lands for stock to graze upon, and an abundance of pure, clear water to allay their thirst.

The nearest railroad now completed runs within about sixty miles from Ozark county, but it is thought that the Kansas City and Memphis Railroad will run through the county.

Our corn and part of our pork are shipped down White River, which runs into the south-west corner of Ozark county; and Springfield is the *ultimate western* market for our produce.

There are large bodies of Government lands in this county remaining unsold, and an abundance of fine timber in several localities

We have as fine water-power here as there is in the State. The Big and Little North Forks of White River, and several smaller streams, furnish an abundance of water the year round. Minerals abound in many places. Immigrants are coming in, and are taking up some of our vacant lands, but there is room for many more, as our county is comparatively new and needs settlers.

PETTIS.

Corresponding Secretary State Board of Agriculture:

DEAR SIR: In compliance with section seven of the law governing the State Board of Agriculture, I hereby inclose you a report of the affairs of Pettis County Agricultural and Mechanial Society.

Inasmuch as there was no report made of this Society to your last annual meeting, I deem it proper to include in this report a synopsis of that for last year, so that the rise and progress of this Society shall be a matter of record from its commencement.

This Society, known as "Pettis County Agricultural and Mechanical Society," was incorporated under the statute laws of the State on the 2d day of May, A. D. 1870. The following named gentleman were the incorporators: D. H. Smith, O. A. Crandall, Albert Parker, Wm. M. Gentry, G. A. Sturgiss, Jas. O. Ives, W. S. Bouldin, B. B. Lyon, Richard Ritter, Geo. Anderson, J. W. McLuer, Dr. S. D. Martin, Thos. F. Houston, A. C. Scott, Joseph L. Cartwright, Joseph Paget, D. H. Kinney, A. J. Sampson, H. B. Scott, Wm. Lowry, Mentor Thompson, William Gentry, E. S. Barrett, John Newton, D. W. Thompson, H. C. Sinnitt, Geo. Neely, F. Kriekhouse, Wm. P. Paff, Jos. C. Higgins, M. O. Green, A. D. Jaynes, Joseph Byrne, I. H. Rice, F. M. Bradford, N. G. Brown, Jas. R. Dunlap, C. Newkirk, D. H. Petefish, W. P. Jackson, Chas. Richardson, Jno. F. Phillips, C. W. C. Walker, J. R. Barrett, Wesley Kipp, F. J. Cummings, Chas. Lesher, J. M. Fox, W. I Hutchinson, W. F. Ilgenfritz, D. W. Bouldin, Jno. J. Yeater, J. C. Shy, Charlie

Allen, E. F. Parker, Rufus Low, R. J. Gentry, W. H. Porter, H. J. McCormack, Frank W. Hickox, F. Stolts, M. V. B. Shattuck, M. D., John Montgomery.

On the 9th day of May, at the first regular meeting of the stockholders, the following named officers were selected for the current year 1870:

President—Frank W. Hickox.
Vice-President—James O. Ives.
Secretary—T. A. Switzler.
Treasurer—A. D. Jaynes.
Directors—W. P. Paff, Sr., Wm. M. Gentry, Henry J. McCormack, John C. Shy, Geo. Anderson, C. W. C. Walker, J. B. McLuer.

The following constitution and by-laws were adopted, (see printed copy inclosed.) [Failed to come to hand—Ed.]

The stock is subscribed in shares of twenty-five dollars each. The amount is limited to $25,000; amount subscribed 1870, to 31st of December, $11,560.

The first annual fair was held at the fair grounds in the city of Sedalia, commencing on Monday, September 26, 1870, and continued for one week.

The society, as soon as organized, purchased forty seven acres of ground, at a minimum of one hundred and fifty dollars per acre, part of which lies within the city corporation, and all of which has greatly increased in value.

The amount of improvements, including all the buildings, fences, etc., etc., made during the year, aggregate $11,165 31. The amount of premiums offered was $6,000. The total amount of premiums awarded was $4,465. The net profits from proceeds of the first annual fair, after paying premiums and incidental expenses, was $284.35. Premiums were paid in cash, and at the time they were awarded. Considering the most unfavorable weather, almost constant and drenching rain, this fair was voted a success.

The number and variety of articles on exhibition in the Floral Hall were considerable, and comprised apples of great variety, peaches, grapes, native as well as cultivated, pears, potatoes of the several kinds, and every other article in season, the product of careful husbandry, with a view to competitive merit at this fair.

The textile fabrics, together with the art display, were indeed fine. The poultry exhibition was exciting and well represented. The display of improved boars and sows was good, and sheep likewise. In cattle and horses, the arena was the grand success; the liberal premiums awarded induced competition from a distance, and added zest to the fair.

The Hon. Norman J. Colman was appointed to deliver the annual address; the inclemency of the weather and the drenching rains prevented him from delivering his address, and as his time was all

taken up, it was impracticable to postpone the same to another time. The Board of Directors passed the following resolution:

Resolved, That the Secretary is hereby commanded to convey to the Hon. N. J. Colman the thanks of the Association, and to express to the Colonel the regrets of the President and Directors that circumstances forbid the delivery of his address, and that this Association recognise and appreciate his great merits as an advocate of the agricultural interests in Missouri and the Mississippi Valley.

The time fixed for holding the second annual fair was the 18th of September, 1871, to continue six days as before.

Inclosed I send you one copy of by-laws and one copy of annual catalogue. Yours, very respectfully,

T. A. SWITZLER, *Secretary*.

The annual meeting of this society is first Monday in January, and every three months thereafter as quarterly meetings. The annual meeting of stockholders elects directors. The following named directors were duly elected for the year 1871:

President—F. W. Hickox.

Vice-President—C. W. C. Walker.

Secretary—T. A. Switzler.

Treasurer—C. Newkirk.

Directors—H. J. McCormack, John C. Shy, George Anderson, D. H. Smith, A. D. Jaynes, Wm. M. Gentry, Jos. E. Wall.

The directors found, upon examination of the grounds, and the experience of the past year, that an outlay of several thousand dollars additional would be required in the addition of stables, pens, and coverings for machinery, etc., etc. The amount thus expended during the year 1871, was—for lumber $1,095.63; labor, about $500, including the addition of a well and cisterns of water, planting of trees, etc.

The amount of premiums offered by the second annual fair was $7,000. The amount of premiums awarded were $3,352.90, all of which were paid in money. The incidental expenses of this fair, including the clerical help, was about $500. The gross receipts during the week were $4,868.70.

The financial condition on July 20, 1871, was as follows:

Total amount of stock subscribed		$12,291 00
Uncollected of this amount	$2,270 75	
Cancelled	581 80	
Collected	9,438 45	
		$12,291 00

EXPENDITURES—

Fair Ground improvements	$9,547 16	
Expense account to date	1,288 59	
Interest account	302 32	
Sundries	258 87	
		$11,396 94

LIABILITIES—

Bills payable	$8,607 04	
Due Secretary	205 85	
Insurance	125 00	
		$8,937 89

RESOURCES—

Stock unpaid, considered good	$1,688 45	
Bills receivable	290 50	
From rents	27 00	
		$2,005 95

The third annual fair is set for Monday, September —, 1872. Amount of premiums offered, —— dollars.

All of which is respectfully offered.

Yours,

T. A. SWITZLER, *Secretary*.

PHELPS—HOMER RUGGLES.

I have taken some pains to ascertain the status of this county, being correspondent of the Agricultural Department, at Washington.

In replying to your questions, I do not suppose that it is necessary to repeat them, and therefore answer them in the order indicated in your circular:

1. Wheat, corn, oats and some potatoes; also, beef, pork, butter and wine.

2. Wheat, flour, beef and pork.

3. Wheat, about the same; corn, much better; oats, not as good; potatoes, (Irish,) quite poor.

4. Wheat, 12 bushels; corn, 30 bushels; oats, 30 bushels; potatoes, 75 bushels. Of the other crops named, not enough are raised to form an estimate. Hay yields about a ton and a-half per acre.

5. Horses, 15 per cent. increase; cattle, 20 per cent.; mules, 45 per cent.; sheep, no increase; swine, 34 per cent. increase.

6. The Atlantic and Pacific railroad passes through Rolla, the county seat.

7. None, except rafting timber down the rivers.

8. Except our home market, St. Louis is the only one.

I can give no reliable data in regard to immigration, but should judge it to be five per cent. of the total population.

I copy the following from the assessor's books of 1870:

		Value.	Average.
Acres of land	353,031	$2,070,950	$ 5 86
Number of town lots	2,348	163,555	
Total value of real estate in county		$2,234,505	
Number of Horses	2,876	$133,175	46 30
" Mules	629	40,035	63 64
" Neat cattle	9,601	136,261	14 19
" Sheep	9,991	15,165	1 52
" Hogs	18,243	28,965	1 57
All other personal property		277,375	
Total personal property		$630,976	
Total taxable wealth		$2,865,481	

ESTIMATED AMOUNT OF CROPS, 1871.

Wheat	40,000 bushels.
Rye	2,500 "
Corn	235,000 "
Oats	18,000 "
Potatoes	12,000 "
Tobacco	9,000 pounds.
Butter	110,000 "
Sorghum	11,000 gallons.
Wine	10,000 "

ESTIMATED MANUFACTURES, 1871.

Flour and Meal		$350,000
Woolen fabrics		50,000
Saddlery		35,000
Wagons and carriages		75,000
Tin ware		9,000
Lumber		110,000
Leather		15,000
Iron, pig	4,500 tons.	
Iron ore	25,000 tons.	
Iron, blooms	2,500 tons.	
Iron castings	900 tons.	

PHELPS.

Corresponding Secretary State Board of Agriculture:

DEAR SIR: In looking over the "Rural World" a few weeks past, my attention was called to the notice there given of the time of holding the annual meeting of the Missouri State Board of Agriculture for 1871; also of the requirements of the statute in making a report

of the transactions by organized and established county agricultural and mechanical societies. I therefore, in conformity therewith, submit to you, and to all concerned, a report of the condition of the Phelps County Agricultural, Mechanical and Horticultural Society, as follows, to-wit:

On the 5th, 6th and 7th days of September, we held our second annual fair on our new fair grounds, the results of which exceeded our most sanguine expectations. The grounds, which but a few weeks before the fair, were in their natural and wild state, presented a pleasing and finished appearance, which gave evidence of enterprise and perseverance on the part of its directors.

Twenty-four acres of the grounds have been well fenced at a cost of upward of $1,500, and the improvements consist of a half-mile track, together with a building 40x60 feet, for the exhibition of textile fabrics, and farm, orchard and garden products. This is designed to serve as a wing to the main structure, when completed. About one hundred good and substantial stalls and pens for stock were erected; also, several other smaller buildings to be used in connection with the fair. The grounds slope gently to the east, and a pond was made in a suitable place, at very small expense, which affords plenty of water for stock on exhibition.

The whole year, in fact, has been one of untiring effort on the part of the officers of the society, who have labored under many disadvantages in order to accomplish the design of their object, and the final success is due in a great measure to a few of its self-sacrificing and devoted members.

We now have a membership numbering 230 persons, comprising all classes of citizes from all parts of our county, and what we still want, and most need, is the earnest co-operation of our farmers and business men, in order that we may continue to maintain and perpetuate the good name which we have already achieved.

Total number of entries at the fair	347
No. of horses of all ages entered	28
No. of mules of all ages entered	8
No. of cattle of all ages entered	19
No. of hogs of all ages entered	68
No. of premiums awarded	214
Value of premiums awarded	$ 290 25

The financial receipts were as follows:

From yearly membership	$ 2 30
Gate fees	174 50
Entry fees	60 00
Sale of articles donated	17 90
Amount received from rent of booths, etc	53 50
From sale of lumber	161 28
Paid on stock subscriptions	1,339 00
Cash on hand from 1870	193 00
Donated by county court	150 00
Borrowed from bank of Rolla	2,000 00
Borrowed from Life Association of America	2,000 00
Total	$ 6,379 18

EXPENDITURES.

For lumber	$ 1,424 56
For building fence, lumber posts, etc	1,532 85
Building stalls, pens and Floral Hall	414 00
Race track and pond	1,173 00
Police expense	36 00
Other expenses incidental	189 50
Premiums paid	171 25
Insurance	60 00
Paid on note bank of Rolla	930 00
Paid interest bank of Rolla	100 00
Total	$ 6,160 68

LIABILITIES.

Due for lumber	$ 368 56
On race track	94 10
Bank of Rolla	1,070 00
To Life Association of America	2,000 00
Total	$ 3,532 66

Which is bearing interest at the rate of ten per cent. per annum.

ASSETS OF SOCIETY.

Cash on hand	$ 218 50
Tools, etc	53 50
Unpaid stock subscriptions	717 00
Fair grounds and improvements	7,000 00
Total	$ 7,989 00

Leaving a balance of $4,456.34, and showing a financial gain over last year of $2,563.34.

The estimated crops of 1871, as furnished by Mr. Homer Ruggles, United States Reporter for Phelps county, also a member of our Board, are as follows:

Wheat	40,000 bushels.
Rye	2,500 "
Corn	235,000 "
Oats	18,000 "
Potatoes	12,000 "
Tobacco	9,000 pounds.
Butter	110,000 "
Sorghum	11,000 gallons.
Wine	10,000 "

MANUFACTURES.

	VALUE.
Flour and meal	$ 350,000 00
Woolen fabrics	50,000 00
Wagons and carriages	75,000 00
Saddlery	35,000 00
Tin ware	9,000 00
Lumber	110,000 00
Leather	15,000 00

IRON.

Pig	4,500 tons.
Bloom	2,500 "
Castings	900 "
Ore	25,000 "

Marked progress has been made during the past year, in Phelps county; farmers are beginning to adopt the most improved methods of cultivating the soil. Stock-raisers, seeing the advantage of improved and valuable breeds, are sparing no pains in securing the same as fast as possible; and fruit-growing is becoming quite an object in this section. Our home nurseries will soon be able to supply the demand for the best and choicest varieties; this will avoid the extra and unnecessary expense and risk of sending abroad, and enable our farmers and fruit-growers to select for themselves, and to buy just such trees as they want, and as are best adapted to their soil. Much, too, might be said of the grape, and of our vineyards, which are springing up all around us; but of the adaptation of our soil to this profitable and delicious fruit, most of our readers are well informed. Thousands of gallons of the best of wine were manufactured in our county during the past year, and I think no better facilities for the successful cultivation of the grape can be found than in Phelps county.

A National Bank has been established at Rolla the past year, and is now in successful operation. Phelps county being the commercial center of several counties, this will add much to the material prosperity of our community.

In this connection, I will mention that our people are not behind in educational matters, but seem to be awake to the demand of the times, and have just completed a beautiful public school edifice, at a cost of $30,000, which has no equal in South-west Missouri.

Though not in design, an institution for agricultural education, the State School of Mines, now in active operation at this place, may be made, and doubtless will prove itself, subservient to proper systematic agriculture, as well as to the development of our mineral resources. Already there has been fitted up a convenient and well-furnished laboratory, through the operations of which knowledge will be obtained of the composition of our soils, limestones, etc., as well as of our metallic ores and minerals. Science is so interwoven with all the great industrial arts that its teachings, though professedly in the direction of one application, subserve all others, and thus the geology, mineralogy, chemistry, physics and other branches of the physical and natural sciences taught at this school, while confessedly looking at mining and metallurgy as the immediate object, will benefit our agriculturalists as well. Every man is a better farmer, as he is a better workman in every line, the more he is acquainted with natural laws, the deeper he looks into the causes of the every-day

phenomena with which he is brought into contact; and, if our young men can be brought to a knowledge and realization of this truism, and will avail themselves of the advantages offered by this school of applied science, we may hope for a more thorough and legitimate development of our agricultural resources.

At present, the School of Mines is occupying quarters in the public school building, but the contract has been let for the erection of the proper building, to cost $85,000. On the completion of this a full Faculty will doubtless be elected.

It is unnecesary, I think, to speak further of the morals of our people, after having alluded to some of the advancements made in educational interests. Judging the future by the past, our prospects seem very flattering, and I trust ere another year has ended, that we may be able to speak of many other valuable improvements in Phelps county.

The officers of our Society, for the present year, are—

President—E. W. Bishop.
Vice-President—A. Newman.
Recording and Corresponding Secretary—W. B. Tallman.
Treasurer—S. Ruggles.
Directors—E. W. Bishop, A. Newman, T. Q. Emerson, Henry Cleine, J. K. Hare, H. Ruggles, A. F. Pack, H. L. Wheat and E. Soest.

Respectfully, your obedient servant,

W. B. TALLMAN,
Secretary Phelps Co. Agricultural and Mechanical Ass'n.

ROLLA, Mo., December 5, 1871.

PERRY—HON. WM. H. BENNETT.

The leading agricultural staples of Perry county are wheat, corn, oats, rye, barley, and potatoes, sweet and Irish.

We export most—first, wheat; second, corn; third, barley. The wheat crop of 1871 was about fifty per cent. less than that of the previous year; corn comparatively better, and about an average crop both years.

The average crop of corn is about forty bushels; wheat ten to fifteen bushels. But good wheat land produces from twenty to thirty bushels per acre; oats thirty to forty bushels; barley the same; rye not much raised. Potatoes have been injured by the bugs.

I think there is an increse of quality in horses, swine and mules; farmers are taking an interest in improving the old scrub stock. This is witnessed more in cattle and pigs than horses.

Our nearest point to a railroad is Fredericktown, (30 miles,) on the Iron Mountain Railroad. The nearest point to water navigation is St. Mary's, on the Mississippi River, (12 miles).

We have a fine locality for fruit—peaches, apples, pears, apricots; very fine also for grapes.

St. Louis is our chief market.

The immigration is small; consists of Germans and French.

I have conversed with several threshers, and the above statement in regard to the wheat crop is correct, from information received in that direction.

PULASKI—Wm. Krousy.

At your request, I herewith submit a statement of the condition of agriculture in this county. Geographically, Pulaski county is situated in the south-western portion of the State. The conformation of the land is generally broken and uneven; soil good in the valleys and a portion of the uplands, with an abundant supply of water, and most valuable water privileges on the Gasconade and several smaller streams. The country is heavily timbered with a growth of forest trees of all the valuable varieties, lying mostly within convenient shipping distances from the St. Louis market.

CROPS.

Agriculture, in our county, may be said to be as yet in its infancy; our farmers, however, are beginning to realize the fact that they must adopt a more improved method of tilling the soil, instead of simply impoverishing their fields by constant culture until they can no longer sprout even a grain of corn, and then turning them out as old worn-out and worthless fields.

Corn is our principal staple, producing from thirty to sixty bushels an acre. Wheat is next in importance, yielding from ten to fifteen bushels per acre. Oats, fifteen to twenty bushels. Potatoes are grown in small quantities only.

EXPORTS.

We export mostly wheat; next in importance is live stock, of which large quantities are shipped. Traders come among us to buy stock, and are always ready to purchase our surplus at remunerative prices. This is a superior section for stock-raising, on account of our fine ranges and mild winters. What we need is the introduction of better breeds of horses, cattle, sheep and swine. Improved breeds have been too much negelected by our farmers.

FRUIT.

We have now in bearing a few small orchards, producing as fine fruit as can be grown anywhere in this State, and I am pleased to notice a growing interest manifesting itself among our farmers for this branch of horticulture, and many promising young orchards springing up all over the county.

This is emphatically the land of the grape, and large wild vines cover all our hill-sides and valleys. Small vineyards are already being planted in several places. This year, Mr. Joseph Feldman, of Humboldt, raised a fine crop of large, beautiful grapes from a vineyard planted in 1869. Mr. Feldman is the pioneer of grape culture in Pulaski, but a number of others are now following in his footsteps.

SCHOOLS AND CHURCHES.

Our district schools are open from four to six months in the year. The buildings, in many instances, are not as good as might be desired. At Waynesville, the county seat, a fine school-house has been erected, and at Richland a very promising institution of a higher grade is in operation, which is now attended by about eighty scholars. Of churches we have none; divine service being held in the district school-houses.

MARKETS.

Our principal market is St. Louis, which is reached by the Atlantic and Pacific Railroad.

MINES.

Iron and lead of the best quality have been found in our county in large quanties. Until recently we lacked the necessary facilities for shipping our ores to market, but the deficiency is now supplied by the Atlantic and Pacific Railroad.

IMMIGRATION

Is needed to develop our resources. Our hill-sides invite the grape-grower, and our bottoms are patiently waiting for the sturdy plow-man, to reward him with their harvest of golden corn and waving wheat. Our mines only need the appliance of capital and labor to yield forth their hidden resources. The tide of immigration will follow in the wake of our new railroads, and hundreds of happy homes must soon cover hill-sides and valleys now shaded by an unbroken wilderness of dense forests.

RALLS—Geo. W. Waters.

Corresponding Secretary State Board of Agriculture:

As I duly appreciate the importance of your work, in presenting to the world a true statistical account of the resources of our State, I take pleasure in answering your queries to the best of my ability, in their order.

1. The staple products of Ralls county are, in the order of their enumeration, wheat, corn, oats and hay, besides cattle, hogs and sheep. The county is partly covered with prairies, and partly with timber. The timbered land is well adapted for wheat-growing, and the section of country known as "Saverton Hill," near the Mississippi, is noted for the fine quality, as well as great quantity, of this staple grown. The western and southern parts of the county are best adapted for stock-raising, hence export but little grain.

2. The only grain exported to any extent is wheat; our largest income being, perhaps, derived from the sale of cattle, hogs and mules — the latter, however, seem to engage less attention than formerly.

3. Our crops of wheat and corn compare favorably with those of former years; oats and grass were nearly a failure.

4. The yield of crops for 1871 averages as follows: Wheat, 18 bushels; corn, 40 bushels; oats, 12 bushels; rye, very little raised, say 15 bushels; hemp, castor beans, not raised; tobacco not grown to any extent for market; broom-corn not much planted — crop succeeds well here — two small factories in the county; Irish and sweet potatoes and beans may be enumerated among the garden crops, and are not grown extensively, except, perhaps, by a few farmers in the vicinity of Hannibal; the yield of each is usually good.

5. There is a considerable increase in swine, and also a fair increase in cattle and mules, while sheep have been neglected, and have been allowed to depreciate in numbers and grade.

6. Our nearest available shipping point, at present, is Hannibal; the St. Louis and Keokuk Railroad is now being built through our county, the grading being already done; also, a road to Mexico, forming a junction at New London. This will afford us ample railroad facilities.

The Mississippi River is an additional channel of transportation for our produce. Our *ultimate* western market is St. Louis, *emphatically.*

Immigration has not been great in our county. I can not give anything like numbers.

RAY—Hon. Fred. Scoville.

The leading agricultural staples of our county are corn, wheat, oats, hemp, tobacco and potatoes.

The commodities most exported are, in order of importance: first, wheat; second, hemp; third, tobacco.

The crops of 1871 do not compare favorably with the crops of 1870.

The estimated average yield of wheat is 12 bushels per acre; corn, 40 bushels; oats, 10 bushels; rye, 30 bushels; hemp, one ton; tobacco, 1,000 pounds; Irish potatoes, 150 bushels.

The West Branch of the North Missouri Railroad passes through Richmond, the county seat, and the Missouri River is the southern boundary of the county.

The *ultimate* western market of our produce is St. Louis.

No immigration into our county during the past year.

RAY—Alex. Maitland.

Corresponding Secretary State Board of Agriculture:

Dear Sir: I received your circular some time ago, but have deferred answering until now, hoping to gain a little more information.

The leading agricultural products of this county are wheat, corn, oats, rye, hemp and tobacco. Wheat stands first on the export list, corn second, and I suppose oats third—hemp not being raised to such an extent as formerly, on account of the price of labor; there is considerable tobacco grown in parts of the county, but it has also failed in quantity from the same cause.

The crops of 1871 do not compare favorably with former years, wheat suffering greatly from chinch-bug, which in some places almost totally ruined the crop, so that some farmers turned their hogs into the fields, as it would not pay for harvesting.

Corn is also below an average crop, partly on account of the drouth, and in a great many places being destroyed by the chinch-bug and grub-worm—the latter doing more damage this season than ever before. I have seen fields, on new prairie land, that would not produce a bushel of sound corn to the acre; the ground in these places seems to be full of grubs now, and if something does not make them decamp what will we do next season?

Oats almost destroyed by chinch-bugs, and people seem to think that oats are getting to be a very poor crop for the last few years, and

a great many are sowing meadows and dispensing with this crop altogether.

The average yield for this year is:

Wheat, about twelve bushels.

Corn, about thirty bushels.

Oats, I think not more than fifteen bushels.

Rye, being injured by bugs, eight bushels.

Barley, have not heard of any in the county.

Hemp, about 800 pounds.

Tobacco, about 800 pounds.

Castor beans and broom-corn, very little raised for sale.

Irish potatoes, about seventy-five bushels.

Sweet potatoes, can not say, as no one hardly ever raises more than is needed for home consumption.

Flax-seed, none raised to amount to much.

Buckwheat, not much grown.

White beans, very few grown.

There is considerable increase in cattle, and some improvement by introducing good bulls from Kentucky.

Horses are plenty, but I think will not increase much for some time, on account of dull sale. Farmers generally now are going into raising more mules than horses, as the mule always commands money, at some price, and mules, not being so abundant as formerly, have risen in value somewhat.

Very few sheep in the county, a great many farmers having none at all, having sold out a couple of years ago, when sheep were worth almost nothing.

Swine have increased greatly in the last two years, and in some portions of the county have been considerably improved by some very fine ones brought from other States; but it would seem as if now they would decrease very fast, as I have heard of several farmers losing nearly all the hogs they had with cholera, for which it seems difficult to discover an antidote.

The St. Louis and St. Joseph Railroad passes through Richmond, our county seat, but having become bankrupt, has not been of much advantage, but I understand the North Missouri Company have purchased the road, and will put it in fine order soon.

Our other facilities of transportation are the West Branch of the North Missouri Railroad, running across the whole south end of the county, and the Missouri River, for our southern boundary, gives us several roads to market.

At present St. Louis is our great market, but which will be the ultimate one, I can not say. Kansas City seems to be making a bold push for our trade, and I notice lately our merchants buy considerably in St. Joseph, to which place a good deal of coal from near Richmond is being shipped.

As regards immigration into our county, there has been considerable, but I can give no definite information.

There has been a large crop of fruit in the county this year. Apples selling for fifteen and twenty cents per bushel, in the orchard, and not much demand at that. Peaches, average crop; other fruits, especially the small ones, considerably injured by the drouth.

There are several vineyards in the county, which this year bore an enormous crop of very fine fruit, most of which, on account of low prices, has been manufactured into wine—the Concord being the principal variety grown.

REYNOLDS—Murdoch McKenzie.

Our leading agricultural staples are corn, wheat, beef and pork.

The crops of 1871 will average about the same as in 1870; both are better than in the preceding years. From all sources of information, I can report that the average of wheat will not be over eight bushels per acre, the wheat having mostly been killed by heavy frosts. Corn will average about thirty bushels. Oats and rye are mostly sown for pasture, and the other crops named in your circular for family use.

There is an increase in horses and cattle, but none in sheep; wolves and dogs prevent all increase of sheep, and a little more too. The legislature has done well to raise the bounty on wolf-scalps, but should make it $10, to induce hunters to make a crusade against this pest.

There is but a slight increase of swine; wild cats and other animals are very destructive to young pigs.

The nearest railroad station to our county seat is Annapolis, on the Iron Mountain Railroad, about sixteen miles distant.

The ultimate western market for our produce is rather indefinite, being the timber and mineral region extending from Ironton, on the north-east, to Potosi, on the north-west.

I can give no data on immigration. The emigrants will nearly balance the immigrants in numbers.

Farming is carried on here in a very poor style; corn plowing is too much neglected for the sake of the gun and kindred sports.

RIPLEY—Hon. P. Mabrey.

1. The leading agricultural staples of this county are corn, wheat and oats.

2. We do not export grain of any kind, but feed to stock, which is driven on foot to market. Corn is first, wheat second, and oats third in importance in our county.

3. Corn crops from seven to ten per cent. better, and wheat and oats about the same as in 1870.

4. I think the average yield of corn per acre on our uplands (flat woods as they are called here) is about 25 bushels per acre; on our river and creek valleys, 35 to 45 bushels; wheat, about 8 bushels per acre; oats, 25 bushels; tobacco, 800 to 1,000 pounds; but little tobacco raised, because of the long distance to market. Rye, barley, hemp, castor beans, broom-corn, flax-seed, buckwheat, white beans, not raised to an extent sufficient to make any estimate. Potatoes, both Irish and sweet, are raised by almost every householder, but only in quantities sufficient for their own use. Both kinds grow finely here and yield well, but I have never taken the pains to make any estimate as to the number of bushels per acre. There is not an article mentioned in the fourth interrogatory that could not grow well here, and the yield of corn, wheat and oats would be largely increased with proper cultivation.

Being so remote from market as to preclude the raising of agricultural products for export, has had the tendency to keep back any improvement in agricultural implements, or to bring about anything like a high state of cultivation of the soil.

5. There is a small increase in cattle, horses, mules, sheep and swine.

6. Until last spring Pilot Knob was our nearest railroad point, distant 80 miles. At present, Piedmont, on the Arkansas extension of Iron Mountain Railroad, is distant 43 miles. By next summer the same road will pass within about 20 miles of our county seat.

7. We have no other facilities of transportation at present, but have reason to expect that Current river will be put in good navigable condition during next year. If so, we will have a southern outlet via White river.

8. St. Louis is our present market.

The immigration into our county is and has always been very light. We are going slow in increase of population, owing greatly to our remote and isolated position, entirely away from railroads or public thoroughfares.

I have answered your questions hastily and imperfectly, but in the best manner possible, unless I had had time for inquiry and consultation with the farmers of our county.

Had your circular been received in time, I would have taken pains to elicit all the information possible.

Our county possesses many advantages to the agriculturist that have not yet been made manifest to people in search of new locations; chief among which are the low prices of lands, the very fine cattle grazing on our hills, and the mild and salubrious climate of South-east Missouri.

This is a fine fruit and grape-growing county, as has already been fully demonstrated by experiments on a small scale.

SCOTLAND.

The principal products of Scotland county are wheat, oats, corn and hay. Having no facilities for shipping, our grain is chiefly fed to stock. Horses, mules, cattle and hogs are the principal exports.

Recently there has been a railroad built to our place, which will make a change in our exports.

Our wheat, in quality and quantity, is double that of last year, and will average about 22 bushels per acre. Corn is much better than last year, though considerably damaged by chinch-bugs; the average will be fully 35 bushels per acre. Oat crop about equal to last year's; average about 25 bushels per acre.

Irish potatoes, a good average, about 150 bushels per acre. Very few sweet potatoes raised here, and not much tobacco. Rye about 15 bushels per acre. Timothy one and a half ton per acre.

A slight increase in horses, mules, cattle, sheep and swine over last year. Not much immigration for a year or two last past.

ST. CHARLES—Hon. A. H. Edwards.

The leading agricultural staples of St. Charles county are wheat, corn and tobacco.

The commodities most exported are: First, wheat and corn, equally; second, tobacco. Our crops for 1871 were not equal to those of 1870 or former years, on account of scarcity of rain.

The average yield of corn per acre is 40 bushels, and 25 bushels is the average yield of wheat, which is of a superior quality; a great deal of flour is manufactured in the county, as well as a large amount of fine tobacco.

Broom-corn, Irish and sweet potatoes, rye and barley, are grown in considerable quantities, and the yield is as large as in other sections.

There is an increase in cattle, horses, mules, and domestic animals generally.

Our facilities for market are unsurpassed; the North Missouri Railroad passes through the county, and the Missouri river flows along its boundary.

Question.—Where is the *ultimate Western* market for your produce?

Answer.—San Francisco.

The production of fruits of all kinds, suitable to this climate, including the grape, is extensive, and wine is manufactured in considerable quantities.

The lands of St. Charles county are second to none in the State or Union for permanent fertility or productiveness, and there is yet a great deal of land that can be bought at low prices and brought into cultivation.

I hope that you will call attention to this fact.

VERNON—J. R. MORROD.

HISTORICAL.

Vernon county was originally a part of Bates county, and was named in compliment to Col. Miles Vernon, once a Senator from Laclede county.

The first settlers had their share of perils and troubles incidental to the settlement of a new country. One of the Dodge family met his death at the hands of the Indians on the Marais des Cygnes in one of those engagements so common in early times on the border.

Most of the first settlers came first to the Harmony Mission, in Bates county, which was established in 1820 or 1821 under the auspices of the Old School Presbyterian Assembly, for the purpose of civilizing the powerful tribe of Osage Indians, who then occupied the largest portion of the territory now known as South-west Missouri.

PHYSICAL CHARACTER.

The whole surface of the county is rolling and undulating, with successive wave-like ridges and occasional irregular, conical mounds rising above the surrounding prairies, giving graceful outlines to the horizon, and now and then a meandering stream, whose borders are skirted with timber irregularly, which gives a picturesque diversity to the scenery, and renders it pleasant and beautiful to the eye.

CLIMATE.

Our climate is genial, and our winters are mild compared with those of Northern Illinois, Iowa, Wisconsin and Minnesota. The thermometer seldom ever gets down twelve degrees Fahrenheit below zero, and that only at very long intervals. In most of the winters it gets down to five and six degrees Fahrenheit below zero. We have occasional snaps of cold weather, which are seldom of longer duration than three or four days, when the weather gets mild again; however, these snaps are often felt severely by both man and beast, for their coming is generally very sudden, the thermometer falling from twelve to eighteen degrees in a very short period of time; also, the wind at those periods seems to possess a chilling power, unaccounted for by the real intensity of cold weather indicated by the thermometer. Snow seldom lies long on the ground at a time, and only at long intervals. Last winter and the winter of 1855–6 were exceptions to this rule. Most of the old settlers say that our winters have been getting severer in character and longer in duration for the past five or six years. This observation agrees with what notice I have taken of the weather for the past four seasons.

In summer our nights are cool and pleasant, and the great heat of the day is tempered by the gentle breezes that sweep over our prairies, giving life and energy to the system. In some seasons we have in midsummer occasional days of extreme heat.

AREA IN SQUARE MILES.

Vernon county contains 838 square miles, being about thirty miles long from south to north and twenty-eight miles wide from east to west.

NUMBER OF ACRES.

There are 536,000 acres, and out of this area, from best information, not over 15,000 acres that are not tillable and susceptible of profitable cultivation.

POPULATION.

In 1860, 4,300; in 1865 scarcely 500 all told; in 1870, 11,320; and in 1871, from best data, our population has increased since taking the census by the United States Marshal up to 14,000 at the lowest calculation.

STREAMS.

First in magnitude is the Osage, that runs along the northern border, forming in part the dividing line between Bates and Vernon. It is navigable to Belvoir, some thirteen or fourteen miles west of the east line of the county, for medium class steamboats.

Other streams are the Little Osage, Marmiton, Big and Little Dry Wood and Clear Creek. These streams are generally narrow in width, with deep channels and steep banks, which render their currents rapid and dangerous to ford or cross when swollen, and quite a number of fatal accidents have occurred since the settlement of the county.

PROPORTION OF TIMBER AND PRAIRIE.

One-sixth of the area of our county is covered with timber, and the balance is prairie. We have, contrary to the expectations of most people who are used to living in a thickly timbered country, ample timber for home purposes.

The varieties of timber are those usual to the State, viz.: Burr, white, red, black, jack, post and water oak, elm, sycamore, white and yellow cottonwood, black walnut, white, black and shell bark hickory, pecan, pignut, birch, maple, wild cherry, hackberry, linn, mulberry, sugar-tree—this is scarce—box-elder, coffee-bean and many smaller sorts.

NUMBER OF MILES OF RAILROAD COMPLETED.

There are thirty-eight. The Missouri, Kansas and Texas Railway runs thirty-eight miles from the extreme north-east of the county to the county seat, Nevada, in the center of the county; thence due west to the western boundary of the county. This road has been now some fourteen months in operation, with express, accommodation and freight trains running regular schedules.

NUMBER OF MILES OF RAILROAD PROPOSED.

There are forty-four. First, twenty-eight miles by the Laclede and Fort Scott Railroad, from east to west, passing by the county seat. Secondly, sixteen miles by a combination of the Kansas City and Memphis branch of the Laclede and Fort Scott Railroad and the Lexington, Louisiana and Gulf Road, coming by the way of Butler, in Bates county, from the north line of the county to the county seat, Nevada.

EXPORTS

In former years were mostly cattle, and the incoming immigration consumed the surplus products, thus giving a good home market for those commodities, until this year the impulse of railroad transportation has stimulated the export of other products, such as wheat, flour, hides, wool and coal. I have endeavored to get up a commercial statistical statement, which is not exact to a figure, but will be found very nearly correct. The absence of any regular system of report makes it no easy task to get up such statistics correctly, and if one is

not very careful he will find himself making estimates very wide of the mark.

Number of cattle shipped by rail—	
From Nevada	2,300
From Walker's Station	1,008
From Schell City	1,680
Driven on foot	1,500
Amount of wheat shipped by rail—	
	Bushels.
From Nevada	35,000
From Walker's Station	12,000
From Schell City	4,500
Amount of flour shipped by rail—	
	Pounds.
From Nevada	450,000
Amount of lumber (pine) imported—	
	Feet.
Delivered at Nevada	2,300,000
Delivered at Walker's Station	300,000
Delivered at Schell City	175,000
Amount of wool shipped by rail—	
	Pounds.
From Nevada	23,500
	Bushels.
Amount of coal shipped East	125,000
Amount delivered for use at the railroad	150,000
Amount consumed in county	160,000

It must be taken into consideration that a large amount of our products find their way to Fort Scott, on account of its proximity to our western boundary, and that portion of our county is a good farming country, and is occupied by some of our wealthiest and most energetic farmers.

CEREALS.

Our county is not perhaps as well adapted to the culture of that great staple, corn, as the prairies of Illinois or the alluvial bottoms of the Wabash, Missouri and Mississippi rivers, but still with proper cultivation it can be raised and made a profitable and paying crop. The corn crop was most excellent this year, and from best information by personal visit in quite a number of localities, and information derived from the opinion of good judges, the average yield, the county over, will reach a figure near fifty-five bushels per acre, though in some places the invasion of the chinch-bugs reduced the yield in some localities down to one-third of the amount. But for these insects the yield would have been very large. Stalks not unfrequently measured seventeen, eighteen, nineteen and even twenty-one feet in hight. Corn is now selling at twenty-five to thirty cents a bushel in our streets.

WHEAT.

Our county is far better adapted to the culture of small grain than that of corn. All that is necessary for wheat to do well is to have the ground in fine tilth, by plowing and harrowing, and properly rolling after seeding; as the prairie winds in some seasons, by constant play, unearth the seeds. The great majority of our farmers fail to drain off the surface water that sometimes accumulates in the winter season; and the wheat is winter-killed by the expansion of the wet, frozen ground, which throws out the rootlets to the action of frost and cold winds. This can be avoided by running furrows with a plow at right angles every forty or sixty feet, as the nature of the ground demands, to give outlet to the surplus water; or by subsoiling the ground once every two or three years—and nowhere will subsoiling pay better than it does here.

Last spring our wheat crop was most magnificent and promising, and attracted the attention of every person visiting our county; but the invasion of the chinch-bugs reduced the crop terribly. But for these insects, our average would have been, we can safely state, over thirty bushels per acre; but as it is, the average the county over will certainly reach over sixteen bushels per acre, although a few fields were so destroyed by chinch-bugs that the owners deemed it unnecessary to reap. Thirty-five bushels per acre is the highest yield known this season. In times past, forty bushels per acre has not unfrequently been raised. The wheat sown latest seems to have done far better than that early sown, which is contrary to the usual experience, as our best wheat raisers generally get their wheat in from the first to the tenth of September.

The wheat was generally plump and full, and the weight varied from fifty-nine to sixty-seven pounds per bushel. At least one-half of our surplus wheat is in the hands of our farmers, who are holding back for better prices.

Having mentioned the chinch-bug in connection with wheat and corn, I would state that our county has had only one visitation of these disagreeable insects within seventeen years, but they did not then cause half as much havoc as they did during their last visitation.

OATS

Usually do well here, but this year the cold, dry spring preventing them from making much growth of straw, and heading fully, coupled with the chinch-bugs, they did not reach a half crop. Several varieties are sown here—the Norway, Surprise, Somerset and others.

The White Schœnen oats, sent out by the Agricultural Department at Washington, did well, the yield being full large, with fine growth of straw and large, plump berries. Average of oats per acre the county over was about twenty bushels.

BARLEY.

There has not been much of this grain sown, but what little has been has done well; and from the opinion of those who are accustomed to raising barley, it can doubtless be made a profitable and paying crop.

BUCKWHEAT

Is only raised now and then by some of our farmers, whose remembrance of hot buckwheat cakes of a winter morn, still sticks to them from days of old. It grows perfectly, and the yield is as good as in any portion of these United States.

TOBACCO.

Very little is raised, save for home use in small patches in the garden. It thrives well, making excellent growth of leaf, with fine flavor. It is said by old tobacco raisers, from older counties in the State and from Kentucky, that our soil is well adapted to raising tobacco of a superior quality, and it is estimated by them that from fourteen hundred to sixteen hundred pounds can be grown per acre. Vernon county tobacco took the second premium at the St. Louis Fair some years ago.

SORGHUM

Is cultivated by almost every farmer, for home consumption. It grows finely, and yields usually a very fair sirup, that is somewhat disposed to crystalize or granulate into sugar. Contrary to the *ipse dixit* of the noted agricultural writer, Horace Greeley, who insists that sorghum should not be planted in freshly broken prairie sod, it grows finely and yields well in sod ground. The crop this season was scarcely a half crop, as the chinch-bugs were blessed with a sweet tooth, as well as some of the human family, and, to use a slang phrase, "went for them."

VEGETABLES.

Cabbages, turnips, beets, Irish and sweet potatoes, in fact all kinds of vegetables, grow well in our soil, and possess a rich, fine flavor. Beets have been raised that measured twenty-four inches round and weighed ten pounds. Turnips not unfrequently weigh twelve, thirteen and fourteen pounds each, and some have been raised that weighed at least seventeen pounds. Onions have been grown from the seed that measured twelve, thirteen and thirteen and a-half inches in circumference. Turnips and late potatoes did not do as well as usual. The late varieties of Irish potatoes here in use are the Peachblow, Peeler, Buckeye, Neshannock. The early varieties

are the Early Rose and Early Goodrich, the former being a general favorite.

FRUITS.

Our county, indeed this whole section, is emphatically an excellent fruit country; and is as well adapted to the culture of fruits as any portion of the United States in the same latitude. We have several causes operating to produce this. First of all is our dry atmosphere, induced by the exposure of a large portion of the earth's surface to the direct rays of the sun, coupled with the extraordinary absorbing or drying power of the winds, producing free evaporation and sweeping away the moisture from the atmosphere. Another cause is due to the essential ingredients of the soil, which give fruit trees strength and vigor; among those ingredients are the oxides of iron prevailing in the subsoil, which gives tone and vigor to the medullary portion of the trees. These oxides act as tonics and stimulants to the ligneous fibers, as the finer chemical preparations of iron give tone and vigor to the muscular fibers of the human system. In the surface soil we have potash, developed by the natural chemical action of air, light, heat and moisture upon the annual accumulation for centurries past of ashes from the burning prairies; and potash, as every one knows, is found most abundantly in the cortical portions or bark of trees and plants. This potash, diffused through the surface soil, gives growth to the bark, whilst the iron in the subsoil gives tone and vigor to the medullary portion, trus producing a vigorous, equable circulation of the sap throughout the whole system of the tree.

Still another reason is, that we have the proper amount of heat in the later stages of maturity, which enables the fruit to reach full and proper development. This is an important fact, for it is well known that certain kinds of grapes can not be grown in certain latitudes, on account of the lack of proper thermometric condition in the later stages of growth.

Apples.—This is almost a paradise for apples, for they do not grow anywhere better than they do here; and their fine, rich, crisp flavor can not be excelled. They are freer from specks, and preserve better, than the same varieties do East. The apple crop this year was only about half a crop, being injured by the frost. I have been informed by old settlers that an entire failure of the apple crop has not been known in the last thirty years, and only three indifferent crops, including the present season's, have been known to occur in the same length of time. The worst enemy of apple trees we have are the rabbits, that are very numerous here. I have seen but few trees injured here by the borer. The apple trees are vigorous and rapid growers, and bear very early here when properly cultivated.

Peaches—Do well here and grow of very large size, and of fine, delicious flavor. The trees are rapid and thrifty growers, bearing

very early. Fruit has been gathered here in three years from the seed.

Pears.—But few trees of this fruit are in bearing in this county, but what few there are in bearing give indications of great promise as to their being constant bearers, and their being successfully raised. Those planted since the war are growing fast and vigorously.

FRUITS.

Our citizens are manifesting considerable zeal and interest in fruit-culture, and it will not be many years ere fruits will form no inconsiderable portion of our exports. From the best information, from 400,000 to 450,000 trees have been planted since 1866, in Vernon county, and this fall there have been sold by our home-nurseries, and delivered in Nevada by nurseries from abroad, over 75,000 trees of various descriptions.

All do well here save currants; they seem rather to fail here—from what cause I am at a loss to conjecture. We have an abundance of small fruit—strawberries, raspberries, gooseberries, blackberries, plums and wild grapes, growing large and of fine flavor. The wild grapes on our timbered lands grow thrifty, and are most prolific; there are at least a dozen varieties growing in the county, judging from the difference of the foliage and fruit.

All varieties of cultivated grapes succeed admirably in our soil and climate, and a number of vineyards are in cultivation in Vernon county — some excellent wine having already been made by a number of persons.

[Here follows a description of varieties of the wild grape, and of grape culture in Vernon county, covering some twenty pages of manuscript, which, although interesting and instructive, we are compelled to leave out from want of space.—ED.]

GRASSES.

Ours is indeed the home for grasses, though our farmers do not seem to appreciate the fact and hint that Nature throws out so broadly to them in clothing the soil around them with rich, luxuriant prairie grass; but doubtless the ease with which prairie hay can be procured at simple cost of cutting, curing and stacking, has rendered our farmers loth to spend any time or expense in sowing tame grass. The yield of this grass, some seasons, is often four and five tons per acre. Cattle, horses and sheep all seem to relish it.

Timothy—Very little has been sown, but what has been has done well, and in some instances the yield has been estimated at three tons per acre this season.

Red Clover—When the ground is plowed deeply and well harrowed, it will grow most luxuriantly.

Blue Grass—Grows luxuriantly here, as almost anywhere, and it is often found growing spontaneously around old farm sites.

GRAZING.

Our county is emphatically a grazing section, and our pioneers relied exclusively on raising stock on the range for subsistence and profit. Our county has as yet plenty of outside range, on lands belonging to non-residents; but it is fast giving way, as the tide of immigration pours in, and in half a score of years or more, our range will, in all probability, be swept away by the encroaching furrows o the immigrant's plow and the mandates of the hedge-rows.

CATTLE.

As Vernon is a fine grazing section, with an abundance of range, and a luxuriance of grass provided freely by Dame Nature, cattle, as a matter of course, can be raised cheaply and easily, and many of our old and most successful stock-raisers were accustomed to raise their cattle on the range, spring, summer and fall, with a little prairie hay during our inclement cold snaps in winter, and scarce any shelter save what a grove of timber or straw stack might afford, or a shed made of poles and stakes, covered over with successive layers of prairie hay. But of late years, our winters are becoming severer in character, and our cold snaps longer in duration, necessitating more care and shelter to take our cattle through the winter in good order, and our farmers are becoming more provident, and endeavor to have more shelter and more feed for their stock in winter. Our cattle are of very fair size, generally, for cattle exclusively raised on the range. We have some imported stock in our midst that occupy a place in the herd-book, and our farmers are striving to improve their stock.

HORSES AND MULES

Are as readily and cheaply raised as cattle, and thrive on the range with but little feed in worst weather in winter months. Our stock is of every shade and character, and brought in from every direction. Considerable improvements have been made in the past few years in that class of stock. There is little or no disease among them.

SHEEP.

This branch of husbandry, it seems to me, has been most sadly neglected. Old settlers say that native sheep were always thrifty and perfectly free from disease, until large flocks of sheep were driven in, and disease breaking out among them, spread the disease to native stock. Native sheep all look thrifty and vigorous, and do extremely well for the little care paid to them by their owners, who suffer their sheep to run at large for weeks and months without ever looking after them. The only objection that can be urged against our county in this respect is the rankness and luxuriance of our prairie grass, as sheep delight in short herbage; in the course of time this objection

will be removed—the native grass will be eaten and tramped out, as the country becomes settled.

HOGS

Can be raised easily on the prairies, and still more easily on the bottoms, where mast is generally good. The old scrub stock left after the war are rapidly passing out of existence, and many of our farmers can boast of good stock. The display of fine hogs at our last fair plainly indicated that considerable improvement has been made in that species of animals. Hardly a week passes but what some fine specimen of improved porcines are received at our express office. There is little or no disease among them.

COAL.

While nature has blessed us amply with a genial climate, a fertile soil and many other advantages, she has not forgotten to stock the bowels of the earth with a variety of materials and minerals necessary for the wants of man, and conducive to his comfort and convenience. First of all are our great coal beds, which underlie, in several strata, our whole county; whose great value is almost incalculable to-day, while every week, almost, develops new banks and beds in various sections of the county.

Thus far, I think, I have traced three different strata over the county. The first, or upper bed, is found on the surface of our highest mounds, covered, in many places, only with eighteen inches or two feet of shale or soil; this bed varies from 16 to 24 inches in thickness, is light in weight, and burns readily. The second stratum is about thirty feet below the first bed, and measures, generally, about 22 inches in thickness. The third stratum is perhaps from 50 to 60 feet lower still. The coal is not as heavy as some I have seen, but is firm in texture, free from sulphur, and burns beautifully.

IRON ORE

Abounds in many locations in the county, and exhibits several varieties of the ores. These will be, doubtless, put to practical use.

LEAD.

Walls of this metal have been found in several localities in the county, and, some day, paying quantities of it will probably come to light.

CARBONATE OF LEAD

Has been found in native purity in one locality, some twelve miles east of Nevada.

POTTER'S CLAY.

We have a very fine article of this species of clay in the western part of this county, and at Deerfield, some nine miles west of Nevada, a pottery has been established for the manufacture of crocks, jars, pitchers, drain-tile, flower-vases, fruit-jars, etc., of most excellent quality.

MARBLE.

We have, in several localities, both grey and black marbles, which are susceptible of the very highest polish.

HYDRAULIC CEMENT-ROCK

Is said to be abundant, and inferior to none for cement.

GRIND-STONE GRIT.

In the eastern part of our county, in the bluffs overlooking Clear Creek, are grind-stone quarries of the very finest quality, which at one time were largely quarried. This grind-stone grit can be used with oil, and makes the finest hones for razors or whet-stone for edge tools; a fine article of grind-stone grit is also found near Deerfield, west of Nevada.

COAL OIL.

We have several petroleum springs in the south-eastern portion of the county, known as the Dunnigan and McCoy's Springs, half way between Virgil City and Montevalle, which for years past have been pouring out crude naptha and petroleum.

SULPHUR SPRINGS.

There are quite a number of these springs in various localities throughout the county, and some are of decidedly marked character, and possess considerable medicinal qualities.

VALUE OF LANDS PER ACRE.

Our unimproved prairie lands sell from five to twelve dollars per acre, but most generally range from six to eight dollars—prices varying from nearness of the land to the railroad or distance from timber. Our improved lands vary very much in price, according to the value of improvements—from sixteen to thirty dollars per acre being the price most generally asked; our timbered lands from ten to twenty dollars per acre, according to the character of timber—bottom timber being the most valuable.

AGRICULTURAL ASSOCIATION.

The Vernon County Agricultural Association, in October, 1870, finding their old fair grounds, east of town, cut diagonally by the Mis-

souri, Kansas and Texas Railway, deemed it advisable to lay off the grounds into lots, and to sell them, which was done, and they realized a handsome profit over the original cost. Last spring they purchased twenty acres of ground, due west of town—part timber and part prairie—at the cost of $1,000, and inclosed fifteen acres off the east end with a neat substantial eight-foot pine-paling fence; erected a beautiful octagonal floral hall, forty feet in diameter, tastily arranged within for display; also a fine amphitheater, whose inner ring is sixty yards in diameter, surrounded by four tiers of comfortable seats all around; also a promenade walk, ten feet wide, seven hundred and twenty feet all around the amphitheater, from which a fine view is had of the ring, grounds, town and the adjacent country, and a two-story pagoda for music and judges' stand in center of the ring. It is estimated that the amphitheater will seat, comfortably, some six thousand or more persons.

It is the purpose of the Association to have, the coming season, the seats and promenade well covered in, so that inclement weather will not interrupt the fair programme. On the grounds there is also a well-graded half-mile track, with a pond and a large cistern to supply water for both man and beast.

The grove at the west end has been neatly trimmed up, affording ample shade to tired visitors to stroll under.

Also stalls and pens for the accommodation of stock. The grounds are neatly and tastily arranged, presenting a fine appearance to visitors at the entrance.

Our fair this fall was quite a success, both financially and morally. The attendance was not large until, the third and fourth days, we had a considerable share of visitors and exhibitors from Kansas, and from other counties in this State. The display of cattle was rather meager in number of entries, but most excellent in quality, and the thoroughbred stock of T. W. Stearns, John Brown, John Klountz and E. S. Downing, of our county, were indeed fine.

The display of horses and mules was much more numerous than that of cattle, and their appearance would have done no discredit to the St. Louis fair; quite a number of those exhibited were from abroad, and quite a large share of premiums were carried off by some of our visitors, and among some who carried off prizes were Messrs. Garth, Barker, Salmon and others, from Henry county; W. J. George, of Cass; Waite, of Jasper; S. S. Houman, of Pettis; Church, of Cedar; Messrs. Copes, of Bourbon county, Kansas, and Mr. Jones, of Neosho county, Kansas.

The display of hogs was far better than at any fair previous, there being some thirty-seven entries, mostly from our own county, which indicated plainly that our farmers are making decided improvement in that kind of stock.

The display in the floral hall was most excellent, and surpassed the previous display in that line.

The special premium of fifty dollars for the fastest pacing or racking horse, mare or gelding in harness, or under saddle, one mile heat, two best in three, was awarded to Mr. S. S. Houman, of Sedalia, Pettis county.

The special premium of one hundred dollars for the fastest trotter, one mile heats, two best in three, was awarded to Mr. Waite, of Jasper county.

The special premium of fifty dollars, for the best herd of three mules, was awarded to W. J. George, of Cass.

The special premium of fifty dollars, for the best herd of three head of cattle, was awarded to E. S. Downing, of Vernon.

The special premium of fifty dollars, for the best pair of hogs of any age, was awarded to George W. Batterson, of Vernon.

The special premium of twenty-five dollars, for the best eight yards of gray jeans, was awarded to Mrs. Lancaster, of Vernon.

The Association paid out cash premiums, including special premiums, to the amount of $1,035, and the premiums were paid to the parties to whom they were awarded, before they left the ring, by the treasurer of the Association, and also eighty dollars of silver-ware were given to the tournament and equestrian ring.

The Association received—	
For gate-fees	$500 00
For entry-fees	371 95
From booth-rent	143 00
From stall-rent	18 75
From shares sold	210 00
For damages by railroad	609 00
The total indebtedness of the Association amounts to	$3,260 76
The total amount of assets in notes, secured by mortgage, from sales of lots in old fair ground, and from three lots still belonging to Association in the old fair ground, at cash valuation, and amount due from special premium subscriptions, and other parties, silver-ware on hand, and the valuation, at cash prices, of the fair grounds and improvements, amount to	7,313 29
Leaving a balance in favor of the Association of	3,058 94
Available assets on hand to pay off indebtedness, not including the fair grounds and improvements, amount to	2,267 70
The total indebtedness amounts to	3,260 76
Leaving the Association in debt	993 06

And there are fifty-nine shares of stock to be sold at ten dollars per share, which will all, doubtless, be sold, and will reduce the indebtedness of the Association to $403.06.

Great credit is due the energetic President, Judge H. P. Gray, and the efficient Directors, Messrs. Alex. Wight, H. Karnes, H. C. Cogswell, Wm. F. Ford and Richard Bryan, for the able manner in which they have managed the affairs of the Association, and for their tasteful manner of arranging the fair grounds. A vote of thanks was tendered to the officers of the Association by the shareholders at their annual meeting on the 4th of December, inst., to that effect.

At the last meeting of the shareholders the constitution was amended so as to have a Vice-President and two additional Directors, making seven in all, and the following gentlemen were elected officers of the Association for the present year:

President—Judge H. P. Gray.

Vice-President—Alex. Wight.

Secretary—Joseph E. Harding.

Treasurer—Oscar M. Nelson.

Directors—H. Karnes, H. C. Cogswell, Paul Thornton, John Brown, Judge Wm. T. Ellis, Charles O. Graves, Finis Y. Ewing.

From the character of the gentlemen elected, we may expect that our next fair will be one of the best and most interesting ever held in this section of the State, and that they will be aided, in their efforts, by the liberality and desire of our people to make our fairs reflect credit on the State and county.

WARREN.

In answer to your questions, I will use my limited knowledge, with the advice of one or two neighbors, one of them a thresher.

The leading agricultural staples of this county are wheat, corn, oats, tobacco and broom-corn in 1870, (none in 1871.)

The commodities we export the most are, in point of importance: 1st, wheat; 2d, oats; 3d, corn.

Our corn crop was an average, and was quite as good as in 1870. Oats one-half of a crop, but better than in 1870; tobacco less than the average and less than in 1870. The estimated yield of wheat per acre is fourteen bushels; corn, forty bushels; oats, twenty bushels; rye, poor; barley, good; hemp, none; tobacco, a small crop; Irish potatoes, small yield, owing to the drouth; sweet potatoes, quite good; flax-seed, none; buckwheat, very little planted, only for bees; white beans, none, except in gardens.

There is a very large increase in all kinds of stock.

Our facilities of transportation consist of the Missouri River and the North Missouri Railroad, which runs through the county seat.

Our ultimate western market is St. Louis.

No immigration into this county during last year.

Respectfully,

H. G. QUINCY,
Secretary H. G. F. Club.

WAYNE—Hon. W. T. Leeper.

1. The leading agricultural staples of our county are wheat, corn and oats; the two latter are chiefly fed out to stock.

2. The commodities we export the most are, in point of importance: 1st, hogs; 2d, cattle; 3d, wheat.

3. The crops of 1871 compare with those of the year 1870 as follows:

Wheat, a decrease of fifty per cent. per acre.

Oats, a decrease of ten per cent. per acre.

Corn, an increase of ten per cent. per acre.

4. The estimated average yield of wheat per acre is ten bushels; oats, thirty bushels; corn, thirty bushels.

5. There is an increase of ten per cent. in stock of all kinds.

6. The nearest point to a railroad from our county seat is Mill Springs, on the Iron Mountain Railroad, sixteen miles.

7. No other facilities of transportation at present.

8. The ultimate western market for our produce will be St. Louis.

I can not give any reliable information regarding immigration into our county. The Iron Mountain Railroad will be completed through this county in a short time, and the lumber trade will then become very extensive.

GASCONADE.

I herewith submit my report of our county for 1871, as well as some remarks about the Gasconade County Agricultural Association and fair.

The Association numbers 175 members at present, who pay an annual fee of three dollars each. The Association owns six acres of ground situated within the city limits, and inclosed by a hedge fence in excellent condition. There are on the grounds three large buildings used for fair purposes, besides some five smaller ones, all well arranged, and costing about $5,000 in the aggregate. Besides the buildings, there are stall accommodations for about fifty head of stock, which is sufficient for our purposes at present, as the premiums we offer are too small to attract the competition of owners of fine stock. Besides, we do not pretend to hold a fair for the exhibition of stock, as we have no amphitheater on the grounds, and no room for erecting one, until the Association can command the means to purchase more ground. The premiums offered last year amounted to about $500, which were chiefly awarded to horticultural products, such as

fruit, grapes, and native wines—these being our staples, and not excelled in point of quality and variety by any county in this or any other State of our Union.

The leading agricultural staple of our county is the grape—there being now in Gasconade county over 1,000 acres of vineyards in cultivation, comprising nearly every variety of the native grape known at present in the United States.

The amount of wine made in 1871 is estimated at 300,000 gallons. Fruit-growing is also carried on in this county to a large extent, and peaches, when in season, are shipped at the rate of from 300 to 500 boxes per day, principally to Kansas. Grapes are shipped nearly in the same proportion, besides a large amount of various other kinds of fruit.

The following list is an estimate of the leading products of the county for 1871:

Wheat, 224,600 bushels; corn, 232,198 bushels; barley, 13,766 bushels; oats, 201,600 bushels; rye, 2,000 bushels; wine, 300,000 gallons; molasses, 10,000 gallons; wool, 30,000 pounds; hay, 3,298 tons.

LIVE STOCK.

Horses, 4,636; mules, 1,050; cattle, 12,469; sheep, 14,434; hogs, 17,223.

H. L. HECKMANN,
Secretary Gasconade County Agricultural Ass'n.

LAFAYETTE—PERRY GOODWIN.

Corresponding Secretary of the State Board of Agriculture:

In compliance with your request, I herewith submit a brief report of Lafayette county, to-wit: We have a No. 1 County Agricultural Society, composed of nine directors. Our fair ground is situated one and a half miles due south of Lexington, our county seat; we have twenty-two acres inclosed, with five nice buildings and a splendid amphitheater. Our ground cost $2,000, and we have spent on it for improvements, $10,000, so that its estimated value is at present $12,000. Our gross receipts for 1870 were $3,317.00. Our fair is attended with a grand display of fine stock, farming implements and all kinds of vegetables, fine needle-work, quilts, blankets, etc., and all sorts of jellies, preserves, cakes, wines, and every article used in any community.

Lafayette county has two nurseries; H. Mock of Freedom township is the proprietor of one, and Goodwin & Son of Lexington own the other. This county as a fruit-growing county can not be ex-

celled; apples, peaches, pears, plums, cherries and small fruits grow well. The fruit has been cheap here, but since we have railroad facilities it brings a better price. I will just here mention one apple as a specialty, the Huntsman's Favorite; it is the finest apple now on record, and Goodwin & Son have 10,000 of these trees, two years old, and they sell them at twenty-five cents each, while other varieties are retailed at sixteen cents each. Every man, who owns land, should plant some of them.

The leading agricultural staples of our county are wheat, corn and hemp. Probably 500 acres of tobacco are grown in the county. We export mostly wheat, more than any other article; hemp is second, and corn third. The crops for 1871 are as good as ever was raised in the county; the average yield of wheat is twenty bushels per acre, of corn about fifty bushels, of oats forty bushels, of Irish potatoes 200 bushels, and of sweet potatoes 250 bushels.

We have on hand more horses, cattle, sheep and swine than we ever had in the county at any time before, but there is quite a decrease in the number of mules.

I will mention the crops for 1870 of the following farmers:

A. Doling, 90 acres wheat, 1,300 bushels.

Thos. Shelby, 60 acres wheat, 925 bushels.

Olander Bradley, 125 acres wheat, 3,000 bushels.

J. N. Cortes, 25 acres wheat, 400 bushels.

A. Cortes, 13 acres wheat, 200 bushels.

Edgar Youngs, 47 acres wheat, 1,025 bushels.

Our railroad facilities are good; the St. Joseph branch road runs from North Lexington to St. Joseph, crossing the North Missouri road at the junction, four miles north of our city, further on it crosses the St. Joseph and Hannibal Railroad at Cameron; thus giving us a perfect outlet to St. Louis, St. Joseph, Kansas City and California. The Lexington and Sedalia road is now about completed to Lexington; the Lexington and Gulf road is in a fair way to be completed, running due south, crossing the Pacific road at Pleasant Hill, Missouri.

We have also the Missouri River, which is navigable about nine months in the year.

In 1838 there was a large immigration to our county from Virginia, composed of settlers from the border counties, who entered Government lands in Lafayette county; they have grown up with the county, and the majority of them have become wealthy.

[BY JONAS F. FERGUSON.]

The information given here is applicable chiefly to the townships of Clay and Sniabar.

The leading agricultural staples are corn, wheat, hemp and tobacco. The exports are: first, wheat; hemp, second; tobacco, third; no corn. Comparing the crop of 1870 with last year's, I find that corn,

wheat and oats fall off considerably, while hemp and tobacco are much better. Corn will fall short of last year fully one-fourth in quantity, but of better quality; wheat will not turn out over one-half of the usual average yield, about seven bushels per acre; oats gave a very poor return, probably not more than twice the amount of seed; hemp shows an increase of one-fourth over last year. The fiber is superior in quality. Tobacco yields a very fine quality, and there was an extra amount grown, say an increase of one-third in quantity and quality. Rye is but little grown, barley none. Broom corn, castor beans, buckwheat, flax-seed, white beens, sweet and Irish potatoes, grow very well, but are cultivated for home consumption only. A considerable amount of timothy seed has been harvested here, which is a new industry, the farmers formerly having depended upon other States for their supply. I feel safe in saying, that there was marketed from these townships 200 bushels of No. 1 timothy seed this fall; the average yield being about four bushels per acre. The yield of fifteen acres clover was eighteen bushels of choice seed.

There is a steady increase of horses, cattle, mules; swine have increased about one-half in two years, while the number of sheep has decreased in the same time about one-third.

Our county seat will soon be connected with other cities by a railroad; the Missouri Pacific Company is building a branch road from Sedalia to Lexington, which will be in operation by the 15th November.

We also have river transportation, with good landings within a distance of fifteen miles from any farm.

There is no increase of population by immigration to this part of the county.

Bridgeton, St. Louis County.

I herewith reply to the queries propounded by the circular of the Missouri State Board of Agriculture, dated August 9, 1871, and in my answers, I propose to restrict myself to this section of St. Louis county.

1. Our leading agricultural staples are hay and corn.

2. The commodities we export the most are, I think, hay, corn and wheat, in the order named.

3. Our hay and corn crops were as good as those of 1870; wheat not as good; oats fell short.

As a whole, I think our crops were below the average of our section for a series of say seven to ten years.

The estimated yield of corn for 1871 averages about 50 bushels per acre; oats, 30 bushels; rye, 10 bushels; barley, (fall,) 40 bushels;

hemp about 800 pounds; tobacco and castor beans not grown; broom-corn, 500 to 600 pounds; Irish potatoes, 80 bushels, (usually 75 to 100 bushels;) sweet potatoes, 50 to 75 bushels; buckwheat, white beans, flax-seed but seldom grown. The hay crop this season averaged about one ton and a half; in good seasons it averages here from two to three tons.

I do not think that there is any increase in domestic stock.

St. Louis is our market, and nine-tenths of all the produce is marketed in wagons.

There are some 20 or 25 acres in grapes within three miles of my place. One vineyard of four acres sold 13½ tons this season at $50 per ton. Peaches were a partial failure. Apples abundant.

THOS. G. SETTLE,
President Farmers' Club.

APPENDIX.

ESSAY ON SHEEP HUSBANDRY.

BY G. W. KINNEY.

Having been appointed to open the discussion this morning, in order that I may not weary your patience I have decided to be very brief. As I am not the "Orator" of the Board, I have taken the privilege of jotting down on paper what little I have to say on the subject assigned me: "Sheep—The best breeds for mutton or wool."

I believe it is considered impossible to combine, in a single breed, both these desirable qualities in their greatest perfection. The Southdown breed of sheep is celebrated the world over for the fine flavor of its mutton, but it would hardly be considered the most profitable animal for wool, usually shearing but from two to three pounds per head; when fat, dressing from fifteen to eighteen per quarter. Five or ten years ago the Merino would have been considered the best sheep for wool, usually shearing, of fleece-washed wool, from four to seven pounds per head, and yet falling hardly a quarter behind the Southdown in weight of carcass when at their maturity. When we take into account the greater number that can be kept in a flock together, with little care, and the small amount of food consumed by them in comparison to some of the long-wooled varieties, I am almost certain they would now be the most profitable sheep for wool. As for mutton, I know it is in bad repute in the West, but I have yet to learn that it is not worth as much in New York, pound for pound, as any other breed. But as this breed or its grades were the fashionable sheep in this country for years, the supply has about caught up with the demand for their grade of wool, and other qualities are now bringing better prices and more money per head than these.

Of long-wooled sheep the Leicester takes precedence of all others. This race of sheep owes much of its excellence to the sagacity and

---

NOTE.—The appendix contains several papers which came to hand too late to receive an insertion in their proper place in the report. Among these, the able and instructive "Essay on Sheep Husbandry," by Hon. G. W. Kinney, of Snow Hill, St. Charles county, merits a special mention, and will doubtless be perused by every sheep-grower in the State with all the interest and attention it deserves.

skill of the celebrated breeder, Mr. Bakewell. These fine sheep' either pure or intermixed, are found extensively all over Great Britain.

The Leicesters are now the most desirable sheep for wool, bearing a fleece of the first quality of combing wool, weighing from five to eight pounds per head. Their early maturity and aptitude to fatten make them also very desirable.

In fact, almost all the other long-wooled sheep have been so crossed and intermixed with the Leicesters, that it would be difficult to find a pure-bred animal of any of the original breeds. They are not considered so hardy as the other large breeds, and require shelter from storms, and rich, uniform feed.

The ewes are neither prolific nor good mothers, and the lambs require great attention. In England, where they arrive at their greatest perfection, and furnish the finest quality of strong, lustrous combing wool, they are treated with a great deal of care, fed upon rich pastures during summer, and in winter upon grain, oil-cake and turnips.

They are now crossed quite extensively upon the common Merino of this country, enlarging the carcass, improving the form, and greatly increasing the length of wool.

The lambs from this cross fatten readily at two years old, while the Merinos seldom fatten well until about four years of age. This cross-bred wool has been worth about as much as any, and now brings the first price in market, being termed by manufacturers Delaine wool, which is in very brisk demand.

To those having large flocks of Merino sheep in our State, I do not know of any better way of utilizing them than by crossing with the Leicester.

The Cotswold stands next to the Leicester in quality of combing wool, while they exceed them in weight of carcass. Mr. Spooner says of them: "They are a large breed of sheep, with long and abundant fleeces, and the ewes are very prolific, and good nurses. They have been considerably crossed with the Leicesters, by which their size and fleece have been somewhat diminished, but the quality of their wool and mutton have been considerably improved, and their maturity rendered earlier. The wethers are now sometimes fattened at fourteen months old, and weigh from fifteen to twenty pounds per quarter, and at two years old increase to twenty-four and thirty pounds."

Their wool is strong, mellow, and of good color, from six to eight inches long, and from six to eight pounds per fleece. Their superior hardihood over the Leicester, their adaptation to common treatment, together with the prolific nature of the ewes, and their abundance of milk, renders them in many places rivals of the Leicesters.

But the Cotswold, as well as the Leicesters in their native country, have been accustomed to high feed, kind treatment and shelter. For this reason it would perhaps not be advisable for the majority of

farmers in this section to engage in the breeding of long wooled sheep of any breed, for with the generally negligent care usually given to sheep, they will not pay.

I suppose it the object of these discussions to arrive at what will be the most desirable for the average of us to engage in, and on this subject I presume it was not the intention to decide which is the best sheep for wool, and which the best for mutton, but which is the best for both wool and mutton, at the same time taking into consideration our situation, conveniences, soil, climate, and all other advantages as well as disadvantages.

It would be useless for the most of us to attempt to engage extensively in sheep husbandry with any of the pure-bred long-wooled varieties. They are not to be had in this country, unless we go to Canada, and even there they are not very plenty. We have not got the barns they require to shelter them; we can not raise the turnips; we can not afford to buy oil-cake; we have not time to spare in such attentions as they require; our farms are too large, and we have too many other irons in the fire to attend to.

A few might profitably engage in raising pure bloods to sell for breeding stock to cross upon others.

The native, long-staple, coarse-wool sheep of Missouri are a good basis for a flock for the common farmers. They are a healthy, hardy animal, used to taking care of themselves. The ewes are prolific, and good nurses, giving plenty of milk, and by crossing them with the Leicesters, we would improve the fineness of the wool and the length of staple, thus getting a second quality of combing wool at the first cross. By continuing to use full-blood bucks, we should improve the quality of the wool, but perhaps at the expense of hardiness and prolificacy—we should have better lambs, but fewer of them.

By crossing with the Cotswold, we would not improve the quality of the fleece so much as by crossing with the Leicesters, but we would increase the quantity. We should retain the prolificacy of the ewes and their hardiness, and perhaps obtain a sheep better suited to our situation than by any other cross.

By either of these crosses, the product would be a sheep profitable alike for mutton or wool. By thus crossing for a purpose, always having in view the quality, length and weight of staple, and the form and size of carcass, a flock can soon be built up to equal the famous improved Kentucky sheep.

Perhaps a history of some of these sheep might shed a little light upon the subject. Mr. Scott, near Frankfort, Kentucky, says:

"In the beginning, about thirty ewes were selected from a flock of unimproved common or native sheep, and they were bred to a very fine, large Merino ram—the object being to give more thickness to the fleece and fineness to the fiber of the wool. This was thought more advisable before uniting the coarse, open fleece of the native

sheep with the still more open fleece of the large imported varieties, and the result was satisfactory. The ewe lambs of this cross were bred, after they were one year old, to an imported Bakewell or Leicester buck, of large, round carcass, and a heavy fleece of long wool. The ewe lambs of this cross were, in due time, bred to an imported Southdown buck, of large size and form—the object being to infuse that active, sprightly and thrifty disposition, and high-flavored, beautifully marbled mutton, for which the Southdowns are so justly celebrated.

"The next cross was by a ram which possessed many of the good qualities which it was desired to perpetuate in the flock. He was three-fourths Cotswold and one-fourth Southdown—a large, hardy, active sheep, with a thick and heavy fleece, and his progeny possessed the same qualities in an eminent degree.

"The next two crosses were made by pure-blood Cotswold. The next by a full blood Oxfordshire (which is but another name for Cotswold) ram. They were all animals with short necks, round barrells, broad backs, and full briskets; they added still more to the weight of carcass and fleece.

"They were next bred to a full-blood Cotswold. Every one of these crosses was perceptible in the flock, but in some a particular cross predominated, and *in order to produce more complete uniformity*, he next bred to rams from his own flock. Next, *in order to carry out the same design*, he bred to a mixed-blood ram, whose pedigree showed Cotswold, Oxfordshire, Teeswater and Southdown blood. Next to a Cotswold ram. Next to rams of his own breeding, and for the same object, viz: *to give uniformity and stability* to the flock. He next bred to a mixed-blood ram that had taken the premium at the Louisville State Fair. Next to an improved Kentucky sheep, which had a fleece of remarkable length, fineness of fiber, and was of good size and fine form."

This all extended over a period of thirty-five years, previous to 1860. By this time, he says "the sheep were as essentially alike, and uniform, maintained their identity, and imparted their qualities, as surely as any other breed of sheep. They had been exhibited with success at many State and county fairs; had been sold and sent to almost every State in the West and South, even to California, and all which I could raise from one hundred ewes found ready sale at the uniform price of $30, for those one year old and under. Since that time, well-selected rams of my own raising, or of Leicester or Cotswold blood, have been used." This is a history of some of these famous Kentucky improved sheep, which every person present knows something about. The original stock was nothing but the coarse, native stock of the country; for years using full-blood, long-wooled bucks, with especial reference to improving defective points, either in the carcass or fleece, they were brought up to a high standard of

perfection. Of course, the best ewe lambs were always kept and the poorer ones sold.

The same or a similar course may be pursued by the farmers of Missouri, with results equally as satisfactory and much more profitably than by attempting to breed any of the imported long-wooled or mutton sheep. All these breeds come from a section where the climate, the soil, the system of farming and the management are entirely different from ours, and they almost invariably degenerate after a few years. We can better improve our present stock than attempt to substitute any other for it.

By a little management, a Missouri farmer, commencing with five hundred native ewes and a few Cotswold bucks, would find himself at the close of five years the owner of three or four thousand head of very high grade and profitable sheep, in addition to the cash sales of wool and mutton. Those who will really devote their time to this kind of husbandry, and make a business of it, will make money. They can not fail to.

Suppose the farmer begins with five hundred common, large-bodied, coarse-wooled, healthy ewes, costing $1.25 each. From this flock he will shear next spring two thousand pounds of wool, worth on his own shearing floor forty cents per pound—$800. In the spring he may sell, say fifty early wether-lambs at $2.50 each, making $125, and the succeeding summer, one hundred and fifty full grown mutton wethers, if really fat, at $4 each, bringing $600. This will be about his yearly cash income, varying between $1,800 and $2,000 per annum, not counting his increase in ewe lambs, the value of which ought to offset all expenses.

The cost of the ground which makes such capital sheep ranges in this State is but trifling, and as our winters are short and favorable, the few strips of bottom land naturally associated with such a tract would be ample for the production of winter food. Oats, cut while green in the stalk, grain fully "in the milk," then run through the cutting-box and mixed with bran, form a cheap and good winter food.

By making a business of sheep-keeping, one escapes much of the disagreeable drudgery incident to general farming. An imperishable cash article is produced, and an article so light and valuable as to bear transportation to the very ends of the earth without making it too dear for consumption.

Rats, mice, mold and insects assail grain. It is liable to perish by fermentation, and become of so little value as to forbid its transportation even a hundred miles. Vegetables and fruits decay, butter and eggs spoil, poultry, cattle, hogs and horses must be sold to return an income. Sheep, however, produce an annual crop of wool, besides lambs. Wool is imperishable. It is a staple article, commanding cash on delivery. The wool harvest is soon over, and the amount of farming needed to provide for one thousand sheep during a Missouri winter is a slight matter in these days of drills, reapers and mowers.

Sheep-keeping insures an improvement of the land year after year, while "general farming" insures its impoverishment.

A careful-sheep keeper, owning one thousand sheep and two hundred acres of Missouri hills, will have more money to show in ten years, besides leading a much easier and more comfortable life, than a general farmer owning five hundred acres of Missouri bottom.

I can not close this better than by the following, clipped from the National Live Stock Journal:

"Taking everything into consideration, we are inclined to predict good things for the future of sheep husbandry in this country. At present, both wool and meats are high in all the principal markets of the world. It is not possible with sheep, as it is with swine, to increase production beyond the natural demand for consumption, except by continued effort for a series of years; hence it is fair to expect a continuance of the present healthy demand for all grades of fleece and for superior qualities of mutton for an indefinite future. The flocks of the country are now, as a rule, in the hands of good shepherds. We doubt if there has ever been a time when sheep of all classes were healthier than now, as evidenced by the soundness of staple and full growth characteristic of the domestic fleece now coming forward to market. There is certainly much to encourage the general flock-master, whether his specialty be the production of fine wool, or mutton and wool, or breeding animals of any of the principal varieties; and whether his locality be California or Colorado, Illinois or New England, or either of the Southern States."

FIFTH ANNUAL MEETING

OF THE

MISSISSIPPI VALLEY

GRAPE-GROWERS' ASSOCIATION.

PROCEEDINGS.

The fifth annual meeting of this Association was held in Turner's Hall, St. Louis, on December 19th and 20th, 1871.

President Hull called the meeting to order at 10 o'clock A. M., and then delivered the following address:

GENTLEMEN: During the past year, nature has smiled upon our labors and given to us a bountiful harvest. Our vines have been borne down under their rich clusters of fruit, and our markets every where, for the first time, have been so well supplied that grapes have been within the reach of the poor as well as the rich. In view of the perfect adaptation of American vines to our river slopes and hill lands, this is not more than could reasonably be expected from the planting which you so liberally made, nor is the result, so far as it goes, different from what is desired, for without low prices it is doubtful whether we would ever have determined which of all the varieties, if any, are capable of yielding a good unadulterated wine. But with very low prices, will not vineyardists now, as far as possible, strive to put pure juice wines upon the market, and thereby soon test whether or not such wines will satisfy the American demand, or will be taken instead of beer and other intoxicating drinks? Under the conditions which have obtained, may it not be well to consider the means by which pure wines may best be made? Especially does this seem desirable since a gallon of pure grape-juice of some varieties can now be had for less than an equal quantity of sweetened water of the required weight for gallizing. Also, in selecting a grape for the American taste, had we not best consider whether the aroma of our native grapes, which we have been accustomed to tone down by the addition of sugar water, may not after all be a property which it may be most desirable to retain? for has it not been observed that those who confine themselves to the use of American wines imperceptibly shrink away from the gallized, and even demand all the foxiness which the grapes in their most matured state will impart?

One other point, and we are done. Cool cellars for fermenting wines have been considered indispensable, hence much is taken from

the press into the cellars, where, for a time, the fermentative process is maintained, but as the season advances it is arrested, and the wine remains wholly or nearly inactive until warm weather again occurs, when the fermentation is completed. To us this appears to be wrong, and it may be that a simple query or two will place the matter more clearly before you than can be done by any argument we can make. Do we not, by the terms first and second fermentation, refer to a mere arrested fermentation? and may we not, with advantage to the wine, keep the cellar warm until fermentation is wholly completed, and afterward lower the temperature to age the wine? Wines made this year in this way, but not yet of course aged, will, it is expected, be put upon your tables. We bespeak for these wines a critical comparison with such as have been differently treated.

The Treasurer then read his report.

The Secretary then read the following report:

In an Association like ours, which meets but once or twice a year, it is expected that the Secretary should be better posted, concerning the business of the Association, than any one else, and it is a proper custom that the Secretary should present such facts as may be necessary or of interest. I therefore, in accordance with previous usage, present the following for the consideration of the members:

Some time after the last meeting I called on our former Secretary for the records and such other papers as might be the property of the Society, but I found there had been no record kept that was the property of the Society; I therefore bought a scrap-book and collected the proceedings of the former meetings, as published in Colman's Rural World, and the reports of the Missouri State Board of Agriculture, and pasted the same in this book, where it can be easily referred to.

At the last meeting it was resolved to hold a fall exhibition, and the time left to be determined by the officers of the Association. I accordingly made out a premium list and procured offers of premiums to the amount of about two hundred dollars; but as I received no aid in the matter from any one, and the grape crop ripening so very early, and prices for grapes being very low, so that grape-growers felt too poor to attend a meeting at that season of the year, when all would be busy making their new wines, and as no one seemed to have any faith in the success of our exhibition, I consulted with the other officers and many of the members, and it was nearly unanimously determined not to hold a full meeting, but instead hold a meeting at as early a date in the winter as practicable. The 19th and 20th of December was selected as the best and earliest date at which we could meet without coming in conflict with other meetings held in this vicinity. A call for such meeting was therefore issued and circulated, and published as much as was in my power.

I hope this action will meet your approval. I think it the best course that could have been pursued, and I would here respectfully

recommend that members do not order any full exhibition for a few years at least, but content themselves with good winter meetings. This Association is not in a position to undertake such things; exhibitions are not always successful, and when not, they cost money which somebody has to lose. The last exhibition which we held was not a success, and the losses then sustained have not yet been made good to the parties who had things in charge; and I would recommend that a committee be appointed to audit the accounts of the committee of arrangements who had the exhibition at the "Rink" in charge, and if there is any deficit, that the same be paid out of the first available funds in the treasury. When this Association has proven itself a permanent institution, and enlisted the enthusiasm of its members, and has a good balance in its treasury, then it will be time enough to try the experiment of holding a full exhibition.

E. A. RIEHL, *Secretary.*

On motion, the Secretary was authorized to appoint an assistant to list and prepare the wines for the committees.

On motion of Dr. Clagett, Messrs. Eisenmeyer, Tice and Bush were appointed a committee to prepare rules to govern wine committees.

The Secretary, by request, then read an article from the Detroit Free Press of November 16, on grape-growing and wine-making in the vicinity of Monroe, Michigan, where, among other things, was the following table, showing the weight of must and degree of acid, as obtained this year:

	Degree as tested by Oechle's must scale.	Degree of acid as tested by Twichell's acidometer.
Delaware	82 to 85	6 to 8
Concord	82 to 85	5½ to 6½
Ives' Seedling	79 to 82	4½ to 4½
Norton's Virginia	103	12½
Catawba	84 to 88	6 to 8½

Mr. Husmann, called attention to the statement in regard to Norton's Virginia, and said the report could not be correct: it was an utter impossibility that the must should weigh 103 degrees and contain 12½ of acid.

Adjourned to meet at 2 P. M.

AFTERNOON SESSION.

President Hull called the meeting to order at 2 o'clock.
The following essay from Dr. Dewey was read:

IS WINE-DRINKING SINFUL?

We answer most emphatically *no*. God implanted in our natures a desire for stimulants, and in the beginning placed it within our reach. That wine was intended by Providence for us as a beverage, the Scriptures abundantly prove. When Noah took the animals into the ark, he undoubtedly took in grape-vines, for the first thing he did was to plant a vineyard. This vineyard was undoubtedly planted with God's approbation, and the wine made by his direction, for at that early day Noah could have had no knowledge of chemistry. The mind of man was not then given to invention. Noah, in the language of the Scriptures, was a just man and walked with God.

That Noah and Lot took at one time too much wine, no one denies; but this was four hundred years before the giving of the law. Paul informs us, where there is no law there is no transgression. Christian people admit that matrimony was a Divine institution, yet good men at an early day committed some very grave errors in this matter. Lot's *sober* daughters were the principal criminals in his case.

Solomon's maledictions against wine are principally relied on by the prohibitionists to prove from Scripture that wine-drinking is wrong. But when we consider his terrible errors in matrimony, and his disgraceful end, his tirades lose their effect. The error of the teetotalist is in being righteous above what is written—righteous overmuch. The failure of the temperance movement is mainly due to their exclusion of wine. If they had stuck to what the Bible sanctions, and spent their money in grape-raising and making cheap wine, this generation would see no drunkards.

Theodore Parker and other travelers inform us there is more drunkenness in New England than in all France; and these are the States, especially, where men are righteous above what is written. These are the States where all our delusions and isms originate.

But, to come down to more modern times, we have the highest possible authority for wine-making and wine-drinking—that of Jesus Christ. The first act of Christ, like the first act of Noah, was to make wine. His miracle at the marriage feast of Cana should forever silence teetotalers and Shakers. If he gave Divine approbation to matrimony, he did to wine-making and wine-drinking. There is no evidence that he made the match, but he did make the wine, and a good deal of it. The Jewish wedding feast lasted seven or eight days, and Jesus' mother informed him that the wine was out; whereupon he immediately ordered six watering pots, each containing two or three

firkins, to be filled with water. Admitting they held two and a half firkins each, this would make fifteen firkins. A Hebrew firkin is seven and a-half gallons. This would make one hundred and twelve and a-half gallons of wine—no mean quantity to be drank at one wedding.

But the temperance lecturers say this was *un*fermented wine—must. Well, a hundred and twelve gallons of must drank would flurry and disarrange a wedding party very much—morse so than new cider. The remark of the governor of the feast to the bridegroom about the custom of giving the best wine at the beginning of the feast, and then afterward that which was worse, is reversed. The last was the best in this case, and does away with the must theory.

Barnes, in his notes, endeavors to get rid of this encouragement to drink wine, by saying we must not use wine, unless it was just such as was drank there. He might just as appropriately say we should not marry, unless we married just such a woman as was married there.

Several of the apostles were at this wedding, and no doubt drank the wine. Paul and Timothy used it; and there is not a word in the New Testament against wine-drinking. Jesus was called a wine-bibber and a glutton, because he drank wine and ate fish. As this was his first miracle, his enemies think he made a bad start.

Christ never performed any miracles but what were for the good of mankind. Many of his illustrations and much of his conversation were about wine and vineyards. And when his last sad hour was come, wine was made the fit emblem of his blood, that flowed for us all. It was chosen because best calculated to perpetuate his memory—because it exalts the brain and tranquilizes the soul. Many get rid of the Scriptural authority for wine-drinking by rejecting Christ and his example. With such, we have no controversy. We expect to follow his example and precept here, and to drink wine anew with him in the kingdom of Heaven. Wine has always made our hearts glad. John Wesley said wine was the greatest cordial in nature. He followed Christ in wine-drinking, as well as in regeneration.

The teetotalers, after a thirty years' war on wine, find their efforts a failure. It is the peculiar province and destiny of the wine-grower to stay the progress of intemperance in our land. Our cheap, abundant and soul-inspiring beverage will, in a generation, drive whisky and drunkenness from our land forever.

Let Mahomet, Solomon and Brigham Young utter their denunciations against wine—we, who follow Christ, despise the harem, abhor polygamy and detest prohibition. To the Mississippi Valley wine-growers we look with hope. May it end in fruition.

When dull in mind, in spirit weak,
Some soul-inspiring help we seek;
In wine the needed want is found,
The spirit freed, the soul unbound.

Mr. Peabody—It is perhaps known to you all that I have advocated the use of wine as a means to promote temperance; my observa-

tion in Europe has taught me that where wine is grown and drank there is very little drunkenness, while there is a great deal where distilled liquors are used. We were told that wine making in California would promote temperance, but lately I have seen statements in the papers which would indicate that quite the contrary was the case. We have with us a California grape-grower and wine-maker, Mr. Fagg: I would inquire of him what his observation is on that point.

Mr. Fagg—I have been in California for twenty-two years. There is much less drunkenness now than formerly; we claim in California that the production of wine will drive out distilled liquors, and thus promote temperance.

J. E. Starr—This is a question of no small importance. We, as wine producers, want to stand on high moral ground. I claim that the introduction of cheap light wine will have a most beneficial moral effect. Why, sir, I can remember the time when drunken persons were to be seen on every street in this city; now, fn coming to this meeting, traveling over many blocks, I have seen but one who seemed the worse for liquor. This change is attributable to the introduction of lager beer, which was as persistently opposed as wine is now; before, whisky was the universal drink, and lager beer being something new, it was opposed, but it has fought its way into general use—to the great good of society. We claim that while lager beer has a stupefying effect, and makes people dull, wine, on the contrary, cheers and enlivens.

Isidor Bush—We have a gentleman in this city of high position, who, in former times, surrounded by the influences of liquor, was a drunkard, later became the owner and cultivator of a vineyard, made and drank his own wine, and has now thoroughly reformed. He does not practice total abstinence, but uses wine moderately, and is now a sober man, an ornament to society and an honor to the profession to which he belongs, enjoying the full confidence of his fellow-citizens, who have, and ever will, irrespective of party, re-elect him to the high position which he fills, as long as he may be a candidate.

Mr. Peabody—My kindred and associates are all teetotalers, and blame me very much for the views I entertain, and for associating with wine-makers. When traveling in Europe I took special pains to see the effect of wine on the population, and I found that on the Rhine, in Germany and France, and in Switzerland, where light wine takes the place of coffee with the poorer classes, there was no drunkenness. I then came to the conclusion that wine does not create that insatiate thirst for strong drink that distilled liquors do. Others who have since traveled over the same countries report different results. I know wine does produce drunkenness when too much is taken, but it does not create a thirst for more, like distilled liquors, and hence I consider it the lesser evil.

Mr. Bush then read his essay on the prospects of the native wine trade.

Peabody—What has Mr. Bush to say about the adulteration of the foreigh wines which are imported? Does he think that the short crops of 1871 in Europe will lessen importation in the least?

Bush—Importation for the coming year has nothing to do with the crop of 1871, for it is from the very abundant crops of 1870 that the importations will be made. The amount imported here is so small a figure to the amount produced, that large or small crops do not materially affect it. No doubt there is much adulteration practiced.

Spalding—In one of the last numbers of the *Grape Culturist* there was an article published, which was the report of a committee, appointed by the Minister of the Interior, under the French Empire, whose special duty it was to visit all the wine districts and examine into the manufacture of wine, and their report was that more than ten-elevenths of all the wine produced was fortified by the addition of brandy, whether consumed at home or exported. It is a very rare thing, indeed, to find any foreign wine that is strictly pure.

G. C. Eisenmeyer—While my brother was traveling in Europe he was in a wine-dealer's cellar, who showed him a cask of wine and said, "this grew in this cellar, and for it you Americans pay $2 50 per gallon." I have been assured there were such cellars in New York, and also in this city, where such wine "grows in the cellar" in the short time of two weeks.

H. I. Coe—I would ask Mr. Bush if port and sherry have brandy added to them.

Bush—Undoubtedly all have brandy added; such heavy wines can not be produced from any grape by simple fermentation, for 12 per cent. is all the sugar that can be converted into spirit in the wine; if it should contain more it would remain in the wine as free sugar. I am satisfied that the California wines are also brandied. I bought a lot of California grapes, which came in such condition that they could not be used for eating, but were still as good as ever for wine. These showed no acid, and none marked higher on the saccharometer than 90 degrees; such grapes will not make a wine as strong as the California wines usually are, without an addition of spirits.

Mr. Fagg—In California we add from five to ten per cent. spirit to our port and sherry wines.

Eisenmeyer—I do not believe that a drop of pure Port or Madeira is ever imported into this country by dealers; some private person may, now and then, get a small lot through a friend, but that is all.

The discussion of varieties being in order,

Dr. Spalding said: Plant all the Rogers' Hybrids with caution; I do not believe any will be found to succeed well, generally; all grapes should fruit five years successively before they can be recommended, and, I think, all the Rogers' will fail to do so; they have some very valuable points, but some weak ones also. In some soils these weak points may not show themselves, but in others they do

I think the Rogers' are all defective in the foliage; in the young plants it is good, but when they get old it fails. Martha has advanced a long stride in my estimation, this year; I have never been able to get enough good bunches, but this year I got good bunches and enough of them. It seems to want age before bearing well. My opinion is, that the only white wine grape that can be recommended for general culture is the Martha. The foliage is excellent; the wine is better than white Concord, but not so good as Catawba; quality of wine not best, but good; fruit sold remarkably well in the market at from 10 to 15 and even 25 cents per pound.

Riehl—The Cottage is a very early, black grape; in quality something similar to Martha, more foxy than Concord, and sweeter; small, compact bunches, foliage full as good as the Concord. The Una which I received of Mr. Bull, and for which I paid him five dollars, which should be a white grape, turns out to be a miserable, small black grape, and all letters to Mr. Bull asking to send me plants or wood of the genuine Una, remain unanswered.

Eisenmeyer—We have no Hybrid that is worth anything for general cultivation. Mr. Adolphus Engleman, of Mascoutah, had a great many of the newer varieties on exhibition at the Belleville fair, which were very fine; but on being asked which one he would recommend for cultivation, he shook his head. Some of my neighbors will again plant Catawba.

Wm. Engleman—Taylor produced a very heavy crop in 1870, not so much in 1871.

Spalding—It has been suggested that Cynthiana is only Norton's Virginia under another name; but this is not so, as every one knows who has cultivated both sorts, and drank the wine of both. Cynthiana is earlier, sweeter, larger in bunch and berry, and, I think, makes more wine to the acre than Norton; it is finer wine, but not medicinal like the Norton. Eumelan grafted on strong growing stock has grown well, and given excellent crops of excellent quality; earlier than Concord, skin tough, and stands shipping longer distances; bunch large, berry below medium, skin tough, adheres well to the bunch. Left some hanging on the vines for two months after ripe, and they were then fresh and plump, and the stem green; the foliage is good—better than I expected—stood nearly as well this season as Concord.

Bush—In 1869 I exhibited the Goethe before this association. I had an immense crop the next year; this year it was very poor. From personal examination with friend Riley, I am satisfied that the grape-root louse is the sole cause, and not the unhealthiness of the foliage; the roots were, in many instances, destroyed. At Bluffton they had an immense crop this year—may they not over-bear, and lose their leaves in consequence?

Spalding—Goethe and all the Rogers' Hybrids are apt to lose their leaves before they ripen up their fruit, but, being vigorous growers, may ripen their fruit from the nutriment stored up in the plant for

future use; but they can not do so long—they may do so for one or two, or even three years, but they must ultimately fail. The wine is not of high quality; where it has done well, it has been very profitable. Cunningham is subject to rot, and the most tender variety we have. Herbemont is more profitable and hardier; the best sample of native white wine I ever saw was made from Herbemont, and, compared with the best Rhine wine obtainable, was found superior.

R. Bush—I consider the Herbemont more valuable than Cunningham; have cultivated Cunningham for six years and seen no rot.

Spalding—Herbemont, on favorable soils, is about as profitable as any other sort; the soil should be thin, not too fertile, and, a southern slope is best.

J. E. Starr—I have had the Herbemont for seven years past; it has done well, and in all that time, without any protection, it has been winter-killed but once; on soils not too fertile I think it will be the most profitable white wine grape. Mr. Steritz, on the bluff near Alton, is so well satisfied with it that he will dig up all his other sorts and substitute Herbemont in their places.

I. Bush—On rich soil it grows too rampant, but does not fruit; on poor soil it does not grow so much, but bears immensely.

R. Bush—I fruited one Herbemont vine with four canes, each eighteen feet long, and it bore a splendid crop.

Geo. Husmann—After an acquaintance of fifteen years, I can indorse the Herbemont as one of the most valuable grapes in certain soils.. It will not grow everywhere like the Concord and Martha; the soil should be thin, sloping to the south, south-east, or even east, and underlaid with a limestone subsoil. It must have enough to do to prevent over-luxuriance of growth; it is very difficult to overload it; give it thirty-five pounds of fruit to carry, and it will do better than when it has but ten; wants entirely different treatment from Catawba; give it plenty to do, when it will grow but moderately, and be hardier. We have nine acres of it at Bluffton, all uncovered, and I have no anxiety about its winter-killing if we do not have a Siberian winter; would plant rows six feet apart, and ten feet in the rows. From seventy-eight vines I have produced 2,010 pounds of grapes, many of the bunches weighing twenty ounces. I think the time will come when it will make the favorite sparkling wine. The Cunningham is more tender, good bearer, compact bunch, containing more sugar and flavor than Herbemont, and also a more rampant grower; does not produce as much as the Herbemont; does not rot; makes a wine very much resembling sherry.

Adjourned to 9 A. M. next day.

SECOND DAYS' PROCEEDINGS.

President Hull called the meeting to order at 9 o'clock.

Mr. Bush, from committee to prepare rules, reported that he had examined the records of the Society, and finds there are rules amply sufficient to cover the ground, and asked that the committee be discharged. Granted.

On motion of J. E. Starr, the exhibitors appointed the following committees on wines:

Old Red Wine—J. H. Tice, J. E. Starr and L. D. Morse.

Old White Wine—Dr. E. S. Hull, A. Bœtcher and J. Herbst.

New Wines—R. Bush, A. Scherr and L. Pointet.

Mr. J. E. Starr then read the following essay:

HAVE WE A WHITE WINE GRAPE?

MR. PRESIDENT AND GENTLEMEN: Have we a white wine grape? A singular question, truly. A few years since and this question would have taken a different form and a wider range. We should then have asked, have we any wine grape? Let me here say that there are some—men of intelligence, too, in these matters—who are not yet ready to respond in the affirmative to this latter query. The question that I am called upon to consider will be viewed as applied to the localities under your jurisdiction, and not otherwise. Have we, then, any grape upon which we can rely for producing a good, merchantable white wine? Let me first call attention to the qualities requisite to produce this result. It must be hardy, to enable it to withstand the vicissitudes of our changeable climate; it must be healthy in fruit and foliage, to resist diseases; prolific, to reward the labor expended upon its growth; and its quality should be such as to create a demand, at remunerative prices, for its wine product.

Have we such a grape? Shall we, failing to find all these qualities assembled in one variety, accept of that one which comes the nearest to meeting and filling our wants? We have a long list of varieties, and new ones are being yearly added to it but yet, among them all, I do not know where to turn and find the one that, under our present modes of cultivation, meets all these demands. There is one among them, however, that deserves more than a passing notice, viz.: the Catawba. It has been before the public so long that its merits and demerits are well known, while the demand for the wine gives conclusive evidence of its good qualities in that regard. When wine-making was in its infancy, every variety known at the time underwent a trial; from this trial the Catawba came forth as the most promising, and was indeed pronounced an unqualified success.

These efforts were almost exclusively confined to one locality, as no general attention to grape-culture existed, nor were experiments elsewhere made of such magnitude or with such care. So promising, indeed, was the success of the growers of the Catawba, in the vicinity of Cincinnati, in the early history of its introduction, so promising were the inducements held out of pecuniary gains, that large numbers at once engaged in its cultivation, and capital stood ready to encourage it by establishing wine-cellars, thus making a ready market for the product. This condition of affairs continued for some years, until at last repeated failures forced upon growers the conviction that this grape was a failure, and the grape and wine interest received thereby a serious reverse.

I feel disposed, however, to somewhat question the verdict of failure. I am not willing to give up this choice variety which combines so many excellencies. That growers have failed of success, I will not for a moment question; but a doubt will arise as to where the error lies, whether in the grape or in the cultivator. May it not be with those who have failed? Do they feel assured that what they received as healthy, and which after years of cultivation has failed in their hands, was inherent in the grape? The mute grape can only appeal to us by and through its misfortunes. It came into men's hands full of life and vigor, abounding in luxuriance of wood and foliage, throwing its strong and rampant arms abroad, rejoicing in its wild freedom from restraint, a child of the forest, subject to no law. By man its condition and cultivation were changed; it was bound in bonds, and cut and torn in its every effort to escape; it strove against this unnatural condition of things for years. Is it any wonder that, finally, it became diseased, its only fault being that its habits and wants were not well understood? I am inclined to think that we can not claim perfection in grape culture.

The Catawba in Hancock county, Illinois, is extensively grown, and one of its largest producers assures me that he has had but one failure (and that from frost) in nine years. Other vineyards in Illinois that have come under my observation have likewise produced uniformly good crops.

I have thus briefly touched upon this variety because of the important place it has filled, and also because, as yet, I know of none worthy to take its place. Its failure about Cincinnati and other places where tried proved almost fatal to this industry, but a new era has dawned upon us. The writings of Tudor and others, the promises held out of enormous returns and speedy fortune, have given to grape-growing such a stimulus that even thus early in its career we find the supply exceeding the demand.

This effort, however, has taken one direction chiefly. Attracted by the cry of the grape for the million, and wine for the million, and the wonderful profits to be realized, every planter has fastened his

hopes and expectations upon the Concord. The result has been, that while the grapes and the wine have been offered the million, the million have not responded; neither do I think are any in danger of becoming millionaires by the operation. They who have thus pinned their faith and expectations upon the promises and inducements held out, having embarked largely—and in many cases their all, both time and capital—in the enterprise, are now compelled to call to their aid some variety of grape possessing the qualities I have enumerated to rescue them from total loss and ruin. Hence the query, have we a white wine grape?

It is not expected, I trust, that I shall take up each variety of grape that promises good results and discuss its merits; there is none, as yet, sufficiently tried and proven to merit it. In some localities various varieties have been tested with a view to their general introduction, but no extended cultivation has yet been had that would warrant more than passing notice.

The question under consideration is one of importance; it demands at your hands a solution. Many, very many, finding the market fully supplied, if not over-stocked, with the product of the Concord, are anxiously looking and inquiring for the coming grape. Again, let me ask: Can it be that we have erred in cultivation? Have we been from year to year gradually enfeebling the power of the vine, until at length it yields? or has it been the inability of the vine to meet the demands made upon it? The public await your answer. For myself, I can only say that I know of no white wine grape that is hardy, healthy, productive and of fine quality for wine.

Peabody— I would ask if the reason the Catawba is so universally liked is due to its intrinsic merits, or whether it is because we are more used to it. It has now been before the public for twenty-five years, and may it not be that much of the esteem in which it is held is due to the fact that we are more used to and better acquainted with it than any other? I know when I tasted the first Catawba I did not like it, and, being then used to foreign wines, did not think I ever could like it, but, in the course of time, I got to like it very much—so that I think our taste is very much a matter of education.

Bush—It is so. The Catawba is loved by all American people who love wine because they are better acquainted with it than any other. It does not suit the foreign taste near so well as Herbemont, Rulander and Delaware.

Hull—Is it really necessary to dilute the wine and get rid of the flavor of the grape to make it popular, or do people prefer to have all the flavor the grape will give?

Bush—It can be over-done either way. Think all wine should possess enough of the flavor to give character to it; some wine may contain too much of it, as, for instance, the Concord, which sometimes needs toning down.

Clagett—We want two distinct qualities of wine; we want cheap light wine for the poor man's every-day drink, which the Catawba would make. There are also those who think nothing too good for them, and will pay almost any price; several grapes will make white wine that will suit the latter, the Herbemont, Rulander, Louisiana, for instance. We should try to fill both demands.

Eisenmeyer—I think Herbemont, Taylor and Delaware are as good white wine grapes as the Catawba.

Peabody—I have come to the impression that Concord wine will not improve after it is two or three years old; would like to hear others' experience in regard to this.

Starr—I once made wine for a tenant of mine who took it away from the press, and as soon as active fermentation was over, bunged it up and sealed it tight, and left it so in his cellar without racking off or anything; after having laid in his cellar for over a year, I persuaded him to open it and give me a sample, which was really a very fine article.

Tice—A gentleman from Warsaw assured me that Concord would improve if left on the lees.

The secretary's bill for printing, book for records, and postage, in all amounting to $15, was ordered paid.

Adjourned till 2 P. M.

AFTERNOON SESSION.

The election of officers being the first thing in order was opened by the unanimous election of H. I. Coe, President; Isidor Bush, Vice-President; E. A. Riehl, Secretary, and J. H. Tice, Treasurer.

Mr. Peabody then read the following essay:

THE INTRODUCTION OF NEW VARIETIES OF GRAPES.

If one will look back over the history of grape culture for twenty-five years, he will see that great progress has been made. In 1845, the Isabella was about the only grape-vine cultivated in the open air in the Middle or Eastern States, while in the South and West the chief vine was the Catawba. The cultivation of the vine for profit commenced with these two varieties. The Isabella was planted first around New York and New Jersey for market purposes, while attention was given to the Catawba chiefly on the banks of the Ohio, for wine.

It is now seen that if no other varieties of the vine besides the Isabella and the Catawba had been introduced, vine culture by this time would have become an acknowledged failure. The Isabella, sour and indifferent at best, thrives well only in certain localities on the Hudson and Lake Erie, while the Catawba has proved too diseased and capricious to be relied upon for a long time in any except the choicest localities.

The introduction of new varieties, therefore, has been the only means of keeping public interest awake to this pleasant, but not always profitable pursuit. The Hartford, the noble Concord, the Norton's Virginia, with a long train of successors, all clamorous for recognition, have kept up the interest and excitement from year to year. Here, to-day, hard down upon the close of the year of our Lord 1871—a year memorable for the quantity and quality of the vintage, but a year also of grave disaster to many, because a year of extremely low prices—we meet to discuss the vine with our old enthusiasm, and gather up fresh courage for a new campaign.

I have said that the introduction of new varieties has kept up the interest in vine culture in the past, and yet but a single one of these new varieties, viz., the Concord, has been proved to be cosmopolitan—*i. e.*, adapted to do well under almost any treatment, and in almost any locality, from its native New England home to the Rio Grande, and from the Gulf of Mexico to the lakes. Other varieties which are now before the public, or which may hereafter be brought forward, of even better quality, may prove equally productive, hardy and adapted to all climes. Unless this hope is realized, grape culture east of the Rocky Mountains, for market purposes at least, can make no more progress. It has already struck twelve.

From what has been said, you will understand me to take the ground that our only hope of a brilliant future in the cultivation of the vine is in new varieties. By new varieties I mean those now before the public, but not yet thoroughly tested, and others to be hereafter brought forward.

As no one now believes in the practicability of introducing the European vines into the States east of the mountains, there are left but three sources from which new varieties can be obtained: 1st. From the woods and mountains—*i. e.*, wild vines. 2d. From hybridizing our native vines with foreign varieties. 3d. From seedlings, produced by sowing the seed.

1st. Hunting for wild vines. It is not to be denied that some of the best and most promising grapes now cultivated have been first discovered growing wild, and have been improved by bringing them under the careful hand of cultivation. The Catawba itself, the Norton's Virginia, the Delaware, the peerless Cynthiana, and some others of the highest excellence, have thus worked their way, as waifs of the wilderness, and by their good qualities and good behavior have claimed and maintained their place beside the legitimate children of

the vineyard and the garden. I have no doubt there now exist, among the wilds or mountains of the south-west, unknown varieties of grapes equal or superior to the Cynthiana or Delaware. We frequently hear hunters, trappers, army officers, surveyors, railroad engineers, and others who explore the Western wilderness, speak of grapes of the most delicious flavor, large clusters, yellow, red, black, and often as sweet as honey. Intent on other objects, they eat and pass on, without marking the spot, or perhaps giving the matter any thought till long afterward. As our frontiers move forward, and the attention of the public mind is directed to the subject, there is certainly reason to hope that from this source many more valuable varieties of grapes may be obtained. If any friend of the vine, who is fortunate enough to possess the taste, wealth and leisure, could be induced to spend August and September among the wild vines of Arkansas and the Indian country, making notes and land-marks as he went, and then return again on his track after the fall of the leaf to secure his cuttings, there might result valuable additions to our present list of useful grapes.

2d. From hybridizing the American with the foreign vine. The word *hybrid* is derived from the Greek word *hubris*, which means violence. In accomplishing the act of hybridization an act of violence must be performed. The regularly constituted ordinances of nature must be set aside, and a union forced between two animals or two plants belonging to the same genus, but of different species. A great many obstacles to this union have always to be overcome, and the two species must be closely allied in order to effect any union at all. It is true thrt all the different species of the vine are closely allied, so much so that many botanists regard the *vitis labrusca*, *cordifolia*, *æstivalis*, *vinifera*, etc., as but varieties of the same species differing from each other only in the same degree as the Jeneton apple differs from the Early Harvest. Be this as it may, a great deal of attention and care are requisite to effect hybridization between two grape-vines of different varieties. It is found that the grains of pollen of the vine blossom of one variety, under the microscope, differ in size and shape from the grains of pollen of another variety. They are adapted to pass freely through the minute tubes of the style from the stigma to the germ, each kind of pollen in its own flower. But when introduced to the stigma of the flower of another species, they sometimes flatly refuse to pass the entrance at all; some, because they are too large; others, because they are not of the proper shape. It is said that the grains of pollen of the *vitis vinifera*, *i. e.*, the European wine grape, being small and round, will readily pass the tubes of the style of the *vitis labrusca*; but the opposite process is more difficult, if not impossible. In all hybrids between the European and the American vine the pollen of the former is always used to fertilize the latter. The foreigner becomes the male and the native the female in the operation.

By this delicate and tedious process of violence we have already a large number of vines professing to combine the excellences of the European with the hardiness of the American vine. The first to introduce itself to our notice was Allen's Hybrid, a most delicious white grape, thus presenting the good quality of the father, but possessing none of the sturdy character of the mother. It has already been discarded from the list of grapes for field culture in the United States.

The magnificent and brilliant achievement of Mr. Rogers, of Salem, Mass., followed with great rapidity in the footsteps of Allen's Hybrid, and his hybrids are now undergoing the severe tests of different climates and different localities.

The less conspicuous productions of Mr. Arnold, of Canada, are also undergoing the same tests, and other connoisseurs of vine culture are following in the same fascinating pastime.

Now, I am not disposed to take ground boldly that hybridization is of no importance to grape culture, nor that all the hybrids produced by Mr. Rogers and others will ultimately prove to be absolute failures. The Goethe, Wilder, Massasoit, Merrimack and others are much thought of in various quarters, and there is no denying the fact that many of them produce fruit of very superior quality.

But I am prepared to take the ground that hybridization is not the true pathway to the highest and best success in American grape culture. My reasons are the following:

1. By hybridizing our stalwart native American vines with the less hardy European varieties, your progeny must necessarily partake to some extent of the debility of the less vigorous parent. In the human race, if one parent is tainted with tuberculous disease or scrofula the offspring is liable, especially under unfavorable circumstances, to inherit the taint. This rule holds good with all the domestic animals. The foreign blood which you incorporate in your hybrid vine brings a taint which, sooner or later, will show itself.

2. In all hybrids which I have examined, I discover that the thin leaf common in the foreign vine, and green on the underside, invariably predominates. This leaf structure is not fitted to withstand the severities of our fickle and changeable climate. As a rule, you will find that the health and hardiness of the vine is in direct ratio to the thickness of the leaf, and that all thin-leaved varieties, even of our native vines, are fickle and unreliable.

While, in good locations and under careful culture, the Goethe and perhaps some others of Rogers' Hybrids have been successful, yet no case can be brought forward where any hybrid grape has been fruited for five years, each year with entire success. Some have done well two years, and have dropped their leaves badly the third year. Others have refused to give satisfactory crops the first and second years, and then rotted badly the third year.

In view of these considerations, therefore, and others that might be named, it is my firm conviction that if we rely entirely upon the

hybrid for progress, our labors will result in disaster and disappointment in the end. Far be it from me to deprecate the brilliant performances of Mr. Rogers; but whoever looks back over the history of grape culture in the United States twenty-five years from to-day will see that, brilliant and beautiful as have been Mr. Rogers' experiments, his productions will have become simply horticultural curiosities.

3. The third and only other source from which new varieties can be procured is the production of plants from the seed. It is a well-known fact that the seed of the grape, like the seeds of almost every other kind of fruit, will produce a vine often unlike its parent in form, size and general appearance, the fruit of which will differ still more from the fruit which carried the original seed. In the case of the grape-vine, this diversity of product is not to be explained by the intermingling of the pollen of adjacent plants, for the result is the same with the fruit from a vine standing a hundred miles from any other. If you plant the seeds of a favorite grape, the Concord, Cynthiana or any other, at least fifty per cent. of the plants produced will blossom, but will bear no fruit. Of the remaining portion a few may produce fruit resembling somewhat the original, but the greater portion will be totally unlike in shape, size, cluster, color and general quality. The most will show a marked deterioration from the quality of the parent, but some may prove superior. It is selecting the very best of those which show any advance in quality over the parent, and from these again producing new plants, till by-and by, in some fortunate combination of the kaleidoscope of nature, you have struck upon the very plant which the world has been waiting for for a century. Such, in a word, is the process by which new varieties of the grape can be produced from the seed. It is a slow and tedious process, requiring a life-time of patient toil for the accomplishment of the best results. But hard and tedious as it is, I point it out, gentlemen, as the true pathway of progress in vine culture in the United States.

The first method noticed, viz., that of hunting for wild vines in the wilderness, differs from the above process only in this: that in the one case human patience and ingenuity and skill accomplish the result, and in the other case Divine Providence, commissioning the birds and the elements as instruments of His will, produces a Delaware or a Cynthiana simply to point our uncertain footsteps in the pathway of true success.

It does not follow as a matter of course that all seedling grapes of fine quality, produced by the above slow and tedious process, will prove to be valuable acquisitions to our list of vines. Mr. Crahore's Diana and Dr. Grant's Iona have good qualities, but they are seedlings of the Catawba, and inherit many of its vices. So also of the Israella. It possesses, in this climate, many of the worst defects of its parent, the Isabella.

This leads me to add that in the selection of seed, that from the most healthy and vigorous plants only should be used in the experiment. The Concord was produced by Mr. Bull, of Concord, Mass., after the patient toil of years, from the wild, sturdy labrusca of the woods. Samuel Miller produced the Martha from the seed of the Concord, the grand-child retaining the vigor of both its parent and grandparent. Whatever may be the fate of Mr. Bull's two new seedlings of the Concord, the Una and the Cottage, both of which he considers superior to the Concord, one thing is certain, they both have the sturdy, healthy look of their parent, and the same thick, heavy leaf.

In view of the above considerations, let me suggest that, as it seems to me, the vine which should in general be the base line of our departure in the production of new varieties from seed, is the Æstivalis. While it is considered a Southern vine, and many of its varieties—as the Cunningham, Herbemont, etc.—are too tender for a Northern climate, other varieties seem as hardy as the Concord or the Clinton. Even seedlings from the Herbemont may prove equally hardy. The Æstivalis has a thick, heavy leaf, which generally holds on till the fruit is ripe. As a rule, its fruit is entirely free from rot. Though vines of this variety are generally planted for wine purposes, it does not follow that seedlings may not be produced which may give us a superior market grape.

I am not sure that any member of the Mississippi Valley Grape-Growers' Association here present has ever given any attention to the production of new varieties; but I know that many are carefully testing those varieties which have been recently brought forward from various parts of the country. To do this effectually and carefully requires at least seven years to each plant—two years to bring it into fruit, and five years of fruiting to decide definitely upon its character and value.

In the meantime, I see no reason why every one of our number who feels an interest in this delightful pursuit should not undertake in his own way the production of seedling grapes. None of us may have the patience or meet the success of Bull or Underhill, or Miller, or Langendorfer, and yet in some happy moment the most obtuse vine-dresser may commit to the earth the seed which shall produce a vine as productive as the Concord, as hardy as the Clinton, as firm and beautiful as the Eumelan, and as delicious as the Iona.

Grape culture, at least for market purposes, can not be advanced to its highest triumph till this is done. We must have a grape of fine quality, of beautiful appearance, of tough skin, which can be shipped from St. Louis without injury to Quebec, Boston, Texas or Minnesota.

The Concord must be consumed within a hundred miles of the spot where it is grown. Transported beyond this distance it rapidly deteriorates, and, unless very carefully handled, becomes, at double that distance, good for nothing. This is found to be the fatal defect of the Concord as a market grape.

In looking over the list of candidates which are coming forward to usurp the place of our noble old friend, there seems as yet to be no one which has absolutely proved itself worthy of the honor.

Gentlemen, I am not able to name the "coming grape," but if I were forced, like Paris on Mount Ida, to render a decision on this 20th day of December, 1871, among all these claimants I would write—Eumelan.

Dr. Hull—I think the essay just read a very valuable one, but there is one point that I wish to allude to which I think is incorrect, namely, the theory of impregnation, which is that of the books: that the grains of pollen pass through a tube in the stigma. This, I think, is incorrect. I have watched the process under the microscope, and I do not find it to act in that way, but the pollen falls *upon* the stigma, and is absorbed by indosmos and exosmos action.

Peabody—The essay was written rather hastily, and the part alluded to I took from the books, and was also led to it by the statement of Dr. Wylie's experiment with the Scuppernong, which, it was said, would not impregnate the European species, but the latter would the former, and the cross so produced would act on the European. I, however, accept Dr. Hull's version, as he has had more experience than myself.

Dr. Spalding—I consider the essay just read the best I have ever seen on the subject; but there is one thing that might be improved. No doubt there is nothing to be gained by hybridizing with the foreign grapes, but I think much to be gained by hybridizing the natives. It is true that most of our valuable grapes are seedlings from the woods, but the different species often grow in close proximity to each other in the woods; and how do we know there is no natural hybridization going on there? I really think the most promising field of success lies in that direction.

The wine committees then made their reports.

REPORT OF RED WINE COMMITTEE.

Red Concord.—No. 2, exhibited by Bush & Co., and made by E. Cambre, Nauvoo, Illinois. A fine article, of good body; 2d best; rated at 85. No. 10, made by Chas. Braches. Light in body, astringent and not quite clear—65. No. 21, made by Theo. Englemann; vintage 1867; clear; well made; 3d best; lacking character as Concord; fair body—75. No. 35, Cliff Cave Wine Company; vintage 1869; a good wine; has suffered from want of proper care—70. No. 41, H. Clagett; vintage 1870; committee divided—agree as to quality, rating it 90—one thinking it pure Concord, two thinking it mixed with Norton; best—90. No. 44, Mr. Brachvogel, Vineland; vintage 1871; air-treated; light wine; pleasant; fair body; lacks character of Concord—73.

Clinton.—No. 38, H. Clagett; vintage 1870, truly fine article; clear; fine aroma; good body—90. No. 39, H. Clagett; vintage 1869; good body; too rough; not clear; imperfect.

Ives.—No. 16, Louis Salzberger; good body; deficient in aroma as Ives—68. No. 36, Cliff Cave Wine Company; fine aroma of variety; rather deficient in body, and too acid—64.

Norton's.—No. 28, F. Braches; vintage 1870; gallized. Committee do not like to pass on sweet wines—50. No. 15, G. C. Eisenmeyer; vintage 1870; light in body; deficient in aroma of variety; not quite clear—60. No. 17, Theo. Englemann; vintage 1870; good wine; mellow; good body; very favorable—85. No. 40, H. Clagett; vintage 1870 (No. 2); splendid article; fine body; pure article; 2d best—90. No. 20, Theo. Englemann; vintage 1865; well handled; light in body and color; deficient in character—75. No. 34, Cliff Cave Wine Company; vintage 1869; good article; astringent; apparently not as mature as No. 40. No. 3, exhibited by Bush & Co., and made by C. Teubner, Hermann. Splendid article; good body; fine flavor; pure; 3d best—88. No. 43, H. Clagett; vintage 1870 (No. 1); deficient in character as Norton's; good body—78. No. 37, Cliff Cave Wine Company; vintage 1870; inferior; deteriorated—55. No. 29, F. Braches; vintage 1869; injudiciously gallized; containing much free sugar—50. No. 45, Mr. Brachvogel, Vineland; vintage 1871; air-treated; excellent article, commended highly; best before committee—93.

NOTE.—The samples Nos. 44 (Concord) and 45 (Norton's), though wines of 1871, were placed among the old wines by the Secretary, because it was claimed they were mature and as good as old wines; therefore, to test the matter, they were put among the old wines without the knowledge of the committee, so as to come in direct competition. One of the committee expressed the belief that they were new wines; the other two did not like to risk an opinion, as they supposed they had received none but old wines.—SEC.

Cynthiana.—No. 4, exhibited by Bush & Co., and made by Aug. Loehnig, Hermann; very heavy, dark wine; fine sample—85.

J. H. TICE,
J. E. STARR,
L. D. MORSE,
} *Committee.*

REPORT OF COMMITTEE ON WHITE WINES.

The Committee on White Wines respectfully report that the wines in this class, as a whole, were excellent. The first examined was White Concord, and were graded as follows, viz:

White Concord.—No. 12, G. C. Eisenmeyer, (P,) graded 72. No. 31, J. J. Kelly, 1867, 2d best—84. No. 27, Theo. Englemann, best—85. No. 96, H. Clagett, (got in by mistake,) 3d best—82. No. 13, G. C. Eisenmeyer (G)—74. No. 74, H. Clagett, 1870—79. No. 30, J. J. Kelly, 1870—70. No. 32, J. J. Kelly, 1869—74.

Cunningham.—No. 5, exhibited by Bush & Co., and made by Aug. Loehnig, Hermann—88.

Delaware.—No. 6, Bush & Son, Bushberg—80. No. 19, Theo Englemann, 1870—90.

Catawba.—No. 33, J. J. Kelly, 1867, 3d best—78. No. 1, exhibited by Bush & Co., and made by E. Cambre, Nauvoo, Illinois, 2d best—90. No. 11, C. Eymann, Warsaw, Illinois, (pure juice, no sugar or water added,) best—90½. No. 26, Theo. Englemann—72. No. 24, Theo. Englemann, 1869—75. No. 23, Theo. Englemann, 1867—60.

Mixed Sorts.—No. 25, Theo. Englemann—80.

Taylor.—No. 18, Theo. Englemann—90. No. 14, G. C. Eisenmeyer—80.

Taylor and Cassady mixed.—No. 22, Theo. Englemann—90.

Wilder.—No. 8, exhibited by Bush & Co., and made by August Loehnig, Hermann—65.

Goethe.—No. 7, exhibited by Bush & Co., and made by C. Teubner, Hermann—70.

E. S. HULL,
ADOLPH BOETTCHER,
JOHN HERBST,
} *Committee.*

REPORT OF COMMITTEE ON NEW WINES.

Your committee appointed to test the wines made this fall have found it very difficult, and have, therefore, taken a Twitchell's acidometer to help them in their judgments. We herewith hand you a report of the new wines found on the table:

Catawba.—No. 84, F. Braches, acid 4½. Very clear for new wine, but containing little alcohol—65. No. 88, Chas. Nagle, acid 6½. Will make an excellent wine when through with fermentation; it must have been made in a very cold place, or the cold must have stopped it in its early fermentation—80.

Herbemont.—No. 82, F. Braches, acid 4½. We think this the best white wine on the table, though it tastes as if it had been gallized to a large extent, as Herbemont generally has a large quantity of acid —90.

Cunningham.—No. 89, H. Clagett, acid 4¾. This wine is not through with its fermentation, and has, at present, a decided sherry taste, as is usual with this variety.

White Concord.—No. 81, G. C. Eisenmeyer, acid 2½. A very poor article. No. 87, Chas. Nagle, acid 4¾. Better than former, though also flat, and has, we think, been gallized too much—80. No. 85, F. Braches, acid 4. This wine, we think, has more alcohol than either of the former, and will make a better wine than either when finished —87.

White Norton's.—No. 91, H. Clagett, (No. 1,) acid 3½. A wine pressed and filled in the casks without standing on the pomace, and therefore of a lighter color than Norton's usually is; very poor—58. No. 92, H. Clagett, (No. 2,) acid 3½. Made same as the former, and somewhat better—62.

Red Norton's.—No. 83, F. Braches, acid 4. Not through with fermentation; has very much body, and will make a very good wine next year—88. No. 86, Chas. Nagle, acid 5½. A poor wine, and, we think, either the cask it was in was not full or not clean. No. 94, H. Clagett, (No. 3,) acid 4. The best sample of Norton's on the table; very clear, and of a very heavy body—90.

Ives.—No. 93, H. Claggett, acid 5. A good wine, but not as heavy as Ives generally is—65.

Concord, Red.—No. 80, E. H. Kortkamp, acid 3½. Very little body—55. No. 90, H. Clagett, acid 4. Heavy, and will probably make a very nice wine—65. No. 95, H. Clagett, acid 4¼. The best sample on the table, and will make a very nice red wine in due season—75.

In conclusion, we wish to say that we do not think any of the above wines fit to go into market as a finished article, for they are not through with their fermentation, and, if bottled, will surely burst the bottles when hot weather comes on.

RAPHL. BUSH, *Chairman Committee.*

Mr. C. V. Riley then addressed the meeting on the subject of the grape-root louse, which, having been already published quite extensively, it is not necessary to reproduce here in full.

The grape-root louse has been preying on the vines from time immemorial, as it is a native. It attacks both roots and foliage; on some varieties it confines itself mostly to the foliage, on others to the roots; it is on the roots where it does the most damage. It is not probable that the insect can be practically controlled so as to avoid its ravages on sorts which are subject to suffer by it; but, knowing what ails the vines and what sorts it prefers, we may be greatly guided in our operations.

Mr. Riley gave a very interesting table, showing how the different varieties were affected by the louse, and which is thought of great interest to grape-growers.

On motion of Mr. Bush, the question of time and place of the next meeting was left with the officers.

Adjourned. E. A. RIEHL, *Secretary.*

ANNUAL MEETING

OF THE

NORTHEAST MISSOURI HORTICULTURAL SOCIETY

The annual meeting of the Northeast Missouri Horticultural Society was held in Hannibal, Missouri, at the library rooms. It was largely attended.

D. Jenkins, President, called the meeting to order.

Mr. Lear, in answer to an inquiry made by the President, concerning the meeting of the State Horticultural Society, stated that so far as this Society was concerned, it was unrepresented.

Mr. Wood stated that six delegates were duly commissioned to go to said meeting, to-wit: Richard Drain, L. W. Towne, W. C. Ebert, M. W. Wood, O. H. P. Lear and Jasper Turner; that two of them went to Kansas City, and a cordial invitation was given to the State Society to hold its next annual meeting with this society, in Hannibal, January, 1873.

The Treasurer, Jonathan Smith, read the following report:

HANNIBAL, MO., January 27, 1872.

NORTHEAST MISSOURI HORTICULTURAL SOCIETY,

In account with JONATHAN SMITH, *Treasurer:*

CR.		
Amount of cash on hand January 1, 1871		$82 90
Amount of cash received—proceeds of fair, June 18, 1871		70 60
Total		$153 50
DR.		
To amount paid out—expenses of fair	$81 00	
To stationery, Corresponding Secretary	35	
To Horticulturist for 1871	1 00	
To Mr. Myers, hall rent	7 00	
To advertising in Courier notice of meeting, January 11, 1871	5 00	
Total	$94 35	
Balance on hand	59 15	
Total	$153 50	

JONATHAN SMITH, *Treasurer.*

The Corresponding Secretary next handed in his annual report, as follows:

REPORT OF CORRESPONDING SECRETARY.

MR. CHAIRMAN: Another year has rolled around, and we are again assembled to decide who shall occupy the "posts of honor." Since we last met for this purpose, many changes have taken place in our Society. The one upon whom we conferred the highest honor has removed to another city. We could only offer him our best wishes; and one of our beloved and most active members has been called to "that bourne whence no traveler returns." We can only say, in the language of our occupation, that we have consigned him to the earth, with faith that he will germinate and spring into new life beyond our mortal vision—the life eternal!

There has been considerable advancement made in our avocation. (Horticulture means the art of gardening, and gardening means cultivating fruits, flowers and vegetables.)

Fruits have been in moderate supply and have brought remunerative prices; the cultivation of vegetables has increased materially; but the past season has shown the necessity for unison among those cultivators, for they grew an excess of some vegetables, and producers were compelled to sell at a very low figure or not at all; while of some other vegetables there were not enough grown to meet the demand. We hope they will be regulated this year, and not all grow the same thing.

Last, but not least, comes the cultivation of flowers. The sight-seer, traveling through the streets of Hannibal to-day, will see more fine ornamental plants and flowers in the window gardens, than he would have seen ten years ago in the front yards and regular gardens in June or July; showing that our ladies are not wasting their time petitioning Congress to give them their rights, but are exercising the rights which God has given them to beautify their homes and dispense happiness to all around them. As we gaze upon those objects of beauty, we can not help the reflection that the hand which arranged and tends them can not be guided by a mind darkened by selfish ambition, or a heart devoid of love, charity and truth: love of freedom, the beauties of nature, and the wonderful power and wisdom of God there displayed; charity for the weakness or distress of a fellow-creature; true to the trust which has devolved upon them, of training the rising generation—fitting them for the high and exalted stations of members of our glorious Republic. We can everywhere see the effect of this in the dispersion of the gloom of superstition which has for ages hung like a pall over the agricultural classes.

S. F. TAFT.

ELECTION OF OFFICERS.

The election of officers for 1872 resulted in the choice of the following gentlemen:

President—Dr. R. N. Anderson.
Vice-President—Jasper Turner.
Recording Secretary—Marc. W. Wood.
Corresponding Secretary—A. E. Trabue.
Librarian and Treasurer—Jonathan Smith.
Agricultural Chemist—Dr. W. A. Gordon.
Professor of Horticulture—D. Jenkins.
Entomologist—S. F. Taft.

The proposition of the Courier to devote two columns of its weekly to agriculture and horticulture, was discussed by Lear, Anderson, Wood, Taft, Teichman and Trabue. A motion to accept a similar proposition made by the Times was lost. Dr. R. N. Anderson was duly chosen editor, to conduct the two columns thus generously offered by the paper.

A. E. Trabue asked whether there was a patent on the "Wire Stake Fence." No definite answer given.

The Society then adjourned to taste a liberal supply of O. H. P. Lear's "patent clarified cider," which was on hand, and pronounced very good.

R. N. ANDERSON,
President.

MARC W. WOOD,
Secretary.

FARMERS' CLUBS OF JASPER COUNTY.

Corresponding Secretary State Board of Agriculture:

DEAR SIR: It is with no small degree of pride that I report to you the prosperous condition of the Farmers' Clubs of Jasper county. If, as some one has said, "civilization in every land is only in a true ratio with agriculture," then indeed is Jasper county rapidly advancing in the arts of civilization.

During the past year I have had more or less correspondence with the different clubs, and through the liberality of the press, some of their proceedings have been published in our county papers, thus assisting to increase the interest, induce a healthy emulation between the different localities, and prove the practical value of Farmers' Clubs.

A fresh impetus was given to the Farmers' Clubs of this county, by the discussion of the new stock law—the discussion in this county being first introduced by yourself, in an able address in its favor about the first of March, 1871. An earnest discussion was kept up many weeks afterward through the Carthage Banner by correspondents. The Farmers' Clubs also took up the question and canvassed it in all its bearings. I might say that while the discussion did not change the minds of any who favored such a law, it did bring over many who had been opposed to it; however, there is yet a large minority, at least in this county, opposed to a stock law.

There are now six active Farmers' Clubs in Jasper county, three of which were organized in 1871, which we consider a fair record when we take into consideration the fact that four and one-half years ago, the wild deer and the wolf roamed almost undisturbed by man right where the accommodating school-houses or the generous farm-houses now furnish places of meeting for these six clubs.

In gathering the material from which to make up a report of the clubs, a request was made for dates of organization, to ascertain which one was senior and entitled to be called the Pioneer Club of Jasper county. From the responses which came, the one that finally settled the question was the following:

MR. SEARLE, *Corresponding Secretary Jasper County Stock and Agricultural Association:*

DEAR SIR: As per your request published in the Carthage papers a short time since, I have the honor to report our organization. From the records in my possession, the Dry Fork Farmers' Club dates back to May 6, 1869. Our regular meetings are at 2 o'clock P. M., on the last Saturday of each month, at King's School-House on Dry Fork. Our election for officers is on the last Saturday in April, annually. The present incumbents are as follows: A. C. Post, President; Orville Frost, Vice-President; Thomas Dryden, Treasurer; Robert Dunn, Recording Secretary; E. L. Chapman, Corresponding Secretary.

Our club consists of thirty active members, and is steadily increasing in numbers and interest. The next subject for discussion, on Saturday, the 21st inst., is "corn culture." The presence of yourself, or any one else interested in developing the farming interests of this county, is respectfully requested.

ROBERT DUNN,
Secretary Dry Fork Farmers' Club.

The pioneer officers of this Pioneer Club were:

President—Jacob Salladay.
Vice-President—O. H. Carpenter.
Secretary—Robert Dunn.
Treasurer—Thomas Dryden.

The meetings of this club are well attended, and their discussions indicate more than average ability in both the theory and practice of farming.

The next club organization in this county was the "Marion Farmers' Club," organized November 19, 1870, at the Carson School-House, three miles east of Carthage, our county seat. They hold their meetings once a week during the winter, and once a month during the summer seasons. Their meetings are well attended and interesting, and their discussions instructive and practical. Upon the subject of planting forest trees, they strongly recommend the American sweet chestnut as one of the most valuable.

I had the pleasure of being present at one of their discussions this month, December, upon the subject of "how to make farming more remunerative," and as one important means to that end, they were enthusiastically in favor of a "Farmers' Store." If they should perfect their present arrangements for starting such a store, it is to be hoped they will have the success they deserve in maintaining it. It takes a rare combination of farmers to successfully operate a "Farmers' Store." However, there is a rare combination in the intelligent and practical farmers of "Marion Club."

Their present officers are:

President—S. A. Butler.
Vice-President—H. W. Earl.
Recording Secretary—A. C. Carson.
Corresponding Secretary—R. Thornton.
Treasurer—Philip Knight.

The "McDonald Township Farmers' Club" was organized January 7, 1871, and have made themselves quite distinguished on account of the sociality of their meetings, and the energy of their Secretary in preparing the proceedings of each meeting for publication in the county papers.

Their meetings are held once a month, during the day-time, at the different homes of the members, upon the social plan, very similar to those pattern clubs which have existed for twenty-seven years in the valley of the Ohio River.

One significant feature is their minute examination of the farm and premises of the member where they meet each time. The Secretary's report of the member's suggestions at these times is very interesting; an improvement here; a commendation there; a fault here; a perfection there; a gate hinge off; a stable door down, etc., etc. But the most attractive of all is the farmers' dinner, which always caps the climax of the sociality of their meetings.

Their discussions are able and instructive enough to do credit to any State Board of Agriculture. Did space permit, I should be glad to report some of them, especially those upon the subject of plowing, which involved prairie breaking, subsoiling and trench-plowing, and fencing, hedging and a stock law, etc.

Their Secretary's report of proceedings sometimes occupied two columns in our county papers.

The following editorial in the Carthage Banner, some time last March, indicates something of the public impression created by those reports:

REPORT OF FARMER'S CLUB.

The reader will find a pretty full report of the doings of the McDonald Farmer's Club on the outside of this paper. Judging from the tenor of the discussions, the sociability of the parties, the big dinners, and friendly criticisms upon the farms and dwellings of individual members, these meetings can not be otherwise than both instructive and entertaining. We are inclined to the opinion that McDonald Township is ahead on this subject. We hope to hear equally good reports from other portions of Jasper county.

The letter paper made use of by this club has printed on one side a neat and appropriate heading, advertising their club, and on the other side a complete description of Jasper county. Their present officers are:

President—W. H. Rusk.

Recording Secretary—A. H. Ingersoll.

Corresponding Secretary—Major J. Tilden.

Their postoffice address is Avilla, Jasper county, Mo., eleven miles east of Carthage.

"The Jenkins Creek Farmers' Club" holds its meetings in the school-house on Jenkins Creek, about ten miles south-east of Carthage, and is doing a good work among the farmers of that neighborhood.

The following communication exhibits something of its condition upon its first organization:

JENKINS CREEK, Mo., April 8, 1871.

E. P. SEARLE, Esq., *Corresponding Secretary Jasper County Stock and Agricultural Association:*

I have the honor to inform you that an organization, known as the "Jenkins Creek Farmers' Club," has recently been established at this place, and consists of sixteen *five* members.

We hold our meetings semi-monthly, on the first and third Saturdays of each month, in the afternoon.

Our subjects for discussion are such as pertain to the general interests of the farming community. "Colman's Stock Law" is the next subject for consideration.

In conclusion, I would say that we would be glad to have you meet with us, or at least, visit us, whenever you can do so.

Very respectfully,

JAMES SPENCE, *Secretary.*

During the winter season they held their meetings in the evenings, and have now a considerable increase in numbers. Their discussions are able and instructive, and indicate some superior knowledge of the theory as well as the practice of farming. Their present officers are:

President—I. A. Wakefield.
Vice-President—John Caldwell.
Secretary—Harry Grieb.
Treasurer—W. J. Robertson.
Librarian—Wesley Ralston.

"The Excelsior Farmers' Club" was organized November 25, 1871, with seventeen members.

They meet semi-monthly, during the day-time, at that most accommodating of all public buildings, the county school-house.

This club is organized under very favorable auspices, being in a neighborhood of good farmers, and farms well improved for a new country, and we shall expect to hear of their making rapid progress in perfecting a first-class farmers' club. The present officers are:

President—David Potter.
Treasurer—Ira Mills.
Secretary—C. Conard.

I am not yet apprised of the existence of more than one other Farmers' Club in Jasper county, and as I have never visited that one, and they have not reported their proceedings, I am not able to report it to you, except that it is in Diamond Grove Prairie, a very beautiful part of Jasper county, about nine miles south-west of Carthage.

All these Farmers' Clubs are in direct communication with the Commissioner of Agriculture at Washington, receiving from his department reports, which, with other books and papers, form a nucleus for libraries, which, are already becoming matters of pride and profit to these clubs. They also receive many seeds, with which they are experimenting.

But while these clubs in general manifest a kind feeling toward our County Agricultural Association, I feel like complaining that they

do not take hold of it as one of their own institutions, and take a pride in making it a complete success. I would not mention this matter if it was only a local difficulty, affecting our county alone; but I know there are scores of county societies in our State which are struggling for existence because they do not get the co-operation of the farming communities generally; hence I would say that farmers, and especially Farmers' Clubs, can show no good reason why they should not take as much pride in the success of their county associations as they do in their neighborhood club associations. It would only make the circle a. very little larger, while their benefits would be more than proportionately increased.

The pioneer club of our county—viz: "The Dry Fork Farmers' Club"—deserves special notice for taking the most interest in our County Association. A majority of them are members, among whom is our President, and they take pride in claiming that they took a majority of the larger premiums at our county fair, except that for horse racing, they took nothing.

That the time may soon come when the number of our Farmers' Clubs shall be multiplied by three, every new one as prosperous as those reported, each vieing with the other to carry off the most of the larger premiums from our county fair, and each manifesting as much pride as did the "Dry Fork Farmers' Club" in announcing that they did not take, or compete for, a premium on horse racing, is the desire of

Your humble servant,

E. P. SEARLE,

Cor. Sec. Jasper County Stock and Agricultural Ass'n.

INDEX

TO

PROCEEDINGS OF STATE BOARD OF AGRICULTURE AND STATE HORTICULTURAL SOCIETY.

AD INTERIM COMMITTEE:

PAGE.

Report of, for Southern District 100
Report of S. F. Taft 104
Report of F. F. Fine 102

AGRICULTURE, STATE BOARD OF—PROCEEDINGS, BY JOHN H. TICE:

Annual session 11
Called Session 9
New Board 35

Apples, revised list of 89
Apples, new varieties 87
Blackberries, list of 66
Cherries, list of 106
Currants, list of 67
Gooseberries, list of 67
Grapes, revised list of 67
Kansas City Exposition for 1871 113
Marketing Fruits. Essay by U. P. Bennett 57
Meteorology. Essay by John H. Tice 72
Meteorological Observations 26
Mission and Management of Horticultural Societies, by D. L. Hall 91
Missouri Valley—Climatology of the, by Geo. S. Park 80
Rocky Mountains—Evergreens of the, by Dr. John A. Warder 63

STATE HORTICULTURAL SOCIETY—PROCEEDINGS OF, BY DANIEL L. HALL:

President's Address, by Hon. H. M. Vories 46
Constitution and By-laws of 111
Standing Committees, reports of 53

VICE-PRESIDENTS:

Report of, from Fourth District 104
Report of, from Sixth District 50
Report of, from Ninth District 50

Vineyards, report of Committee on 16
Peaches, select list of 98
Pears, list of 106
Strawberries 65
Raspberries 65
Vegetables, list of select varieties for Missouri 105
Wines, report of Committee on 87

INDEX TO CORRESPONDING SECRETARY'S REPORT.

PAGE.

AGRICULTURE:

Manufactures as connected with and benefiting. By C. W. Murtfeldt 21
Agricultural Implements 24
Broom-corn 27
Brushes, buttons, bone-black and commercial manures 28
Butter, cheese and condensed milk 28
Cotton goods 23
Hemp and flax, for fiber and seed 26
Highwines and malt liquors 25
Leather, boots, shoes, harness, etc 23
Linseed and castor oils 26
Milling 21
Pickling and preserving fruits and vegetables 25
Sirup, vinegar and wine 28
Tobacco 28
Woolens 21
AGRICULTURAL EDUCATION 107

ANNUAL REPORT FOR 1871—

By C. W. Murtfeldt, late Corresponding Secretary 3
Barley 6
Corn 5
Educators of industrial universities 8
Fruits and wine 7
Hemp 7
Live stock 7
Oats 6
Spring wheat 5
Storm signals 9
Tobacco 7
Trip to Rocky Mountains 11
Wheat 4
Asparagus and its culture. Essay by J. F. Wielandy 64
Blue-grass. Essay by O. H. P. Lear 37

COUNTY REPORTS:

Audrain—by R. W. Sinclair and John P. Clark 225
Bates—by O. D. Austin 226
Bollinger—by John P. McManus 227
Callaway—by H. Larimore 229
Callaway—Report of Agricultural and Mechanical Society—by Chas. A. Bailey 230
Camden—by John W. Armstrong 232
Cape Girardeau—by Hon. Linus Sanford 239
Cape Girardeau—by Henry Bruihl 240
Cape Girardeau—Report of South-eastern District Agricultural Society—by Manning M. Kimmel 241
Carroll—by Hon. James S. Logan 243
Cass—by Alfred C. Leveridge 243
Cedar—by James A. Cogle 246
Chariton—by Hon. Lucius Salisbury 247
Clay—by Hon. Henry Smith 248
Clinton—by John L. Clark 249
Cole—Report of Ninth Annual County Fair—by J. Christy Watson 249
Cole—Adaptability of, for Fruit-growing—by N. DeWyl 251

PAGE.

Cooper—by Hon. M. McMillan 254
Cooper—Report of Agricultural and Mechanical Association—by John Cosgrove 255
Crawford—by J. G. Anderson 256
Crawford—by Newton Jones 257
Dade—Report of Agricultural and Mechanical Society for 1871—by O. H. Barker 258
Greene—by S. N. Ingram 260
Henry—by John H. Britts 260
Holt—by T. C. Dangan 268
Jasper—by E. P. Searle 271
Jefferson—by H. Eshbaugh 282
Linn—by D. C. Strawbridge 283
Livingston—by Hon. Robt. S. Moore 284
Macon 284
Marion—by Hon. Geo. H. Shields 285
McDonald—by Hon. J. C. Lamson 285
Mississippi—by Geo. Whitcomb 285
Moniteau—by Hon. John B. Haas 288
Monroe—by John Magee 290
New Madrid—by John T. Scott 290
New Madrid—by J. Neubauer 292
Nodaway—by Hon. M. B. W. Harmon 293
Osage—by J. K. Kidd 294
Ozark—by Wm. H. Norris 296
Pettis—Report of Agricultural and Mechanical Society, by T. A. Switzler 297
Phelps—by Homer Ruggles 300
Phelps—Report of Agricultural, Mechanical and Horticultural Society—by W. B. Tallman 301
Perry—by Hon. Wm. H. Bennett 305
Pulaski—by Wm. Krousy 306
Ralls—by Geo. W. Waters 308
Ray—by Hon. Fred. Scoville 309
Ray—by Alex. Maitland 309
Reynolds—by Murdoch McKenzie 311
Ripley—by Hon. P. Mabrey 312
Scotland 313
St. Charles—by Hon. A. H. Edwards 313
Vernon—by J. R. Morerod 314
Warren—by H. G. Quincy 327
Wayne—by Hon. W. T. Leeper 328
Gasconade—Report of Agricultural Association—by H. L. Heckmann 328
Lafayette—by Perry Goodwin 329
Lafayette—by Jonas F. Ferguson 330
Bridgeton, St. Louis county—by Thomas G. Settle 331
Farmers' Clubs of Jasper county—by E. P. Searle 368
Honey-Bee, The—Will it pay? Essay by L. C. Waite 33
Lowlands, The, Cattle of. Essay by Dr. H. J. Detmers 41
Mining Industries, Influence of, on Agricultural Pursuits. By R. O. Thompson 50
Mississippi Valley Grape-Growers' Association, (Fifth Annual Meeting,) report of proceedings, by E. A. Riehl 343
North-east Missouri Horticultural Society, report of annual meeting, by R. N. Anderson 365
Prospects of the Native Wine Trade. Essay by Isidor Bush 77
Sheep Husbandry. Essay by Hon. G. W. Kinney 335

St. Louis Tobacco Association:

Address of 87
Fourth Annual Exposition 95
List of premiums for growing crop of 1872 91
Varieties, Origin and Physiology of. Essay by John F. Wielandy 72

ERRATA.

In proceedings of Missouri State Board of Agriculture and State Horticultural Society—

Page 45, line 24 from the bottom, for "tohacco" read "tobacco."
Page 47, line 13, for "Hart" read "Heart."
Page 53, line 13, for "bodlen" read "codlin."
Page 54, line 9, for "profits" read "profit."
Page 103, line 3 from the bottom, for "puhlished" read "published."

In Corresponding Secretary's report—

Page 54, line 13 from bottom, for "limestone" read "limonite."
Page 55, line 5, for "poor iron" read "good iron."
Page 58, line 7, for "sulphurate" read "sulphuret."
Page 60, line 21, for "Kints" read "Kinty."
Page 78, line 9, for "Karpathian" read "Carpathian."
Page 79, line 7, for "Ceuta" read "Cette."
Page 296, line 18, for "Misiouri" read "Missouri."
Page 347, line 7, for "morse" read "more."
Page 348, line 16, for "fn" read "in."
Page 349, line 2, for "foreigh" read "foreign."
Page 357, line 21 from the bottom, for "thrt" read "that."
Page 357, line 19 from the bottom, for "cestivalis" read "cestivalis."
Page 366, line 10, for "bourne" read "bourn."

FOURTH ANNUAL REPORT

ON THE

NOXIOUS, BENEFICIAL

AND OTHER

INSECTS,

OF THE

STATE OF MISSOURI,

MADE TO THE STATE BOARD OF AGRICULTURE, PURSUANT TO AN APPROPRIATION FOR THIS PURPOSE FROM THE LEGISLATURE OF THE STATE.

BY CHARLES V. RILEY,
State Entomologist.

JEFFERSON CITY, MO.:
REGAN & EDWARDS, PUBLIC PRINTERS.
1872.

Entered according to act of Congress, in the year 1872, by CHARLES V. RILEY, in the office of the Librarian of Congress, at Washington.

PREFACE.

To the Members of the Missouri State Board of Agriculture:

GENTLEMEN:—I herewith submit, for publication, my Fourth Annual Report on the Noxious, Beneficial and other Insects of the State of Missouri.

The year just closing has been remarkable for the high mean temperature of its spring and summer, and the unprecedented small amount of rain-fall. Yet mother Earth has yielded abundantly of all kinds of Agricultural products, and our fruit crop has generally been unusually fine. The injuries of the notorious Plum Curculio were, comparatively, so insignificant that plums and even apricots ripened where they had failed for many previous years; and though this result may in great part be attributed to the partial failure of such fruit and the consequent scarcity of the "little Turk" in 1870, I think the Sigalphus parasite described last year must receive some share of the credit. But it is unnecessary to anticipate in any manner the burden of the following pages.

During the extreme heat of the season I made a hasty trip to Europe, for the improvement of health and for scientific purposes. During two months' stay there, I was able to gather some facts of importance without which I could not have laid before you the articles on "Grape Disease," and "Silkworms" to which I call your especial attention, and which, I trust, contain some important truths of vast moment to the State.

I have devoted considerable time to lecturing the past year; and hope to be able to fill still more engagements during the year to come.

Respecting the printing of this Report it is necessary to state that I did everything in my power last winter to have the printing and press-work of the third volume done creditably and in a manner which would do justice to the engravings. Mr. Wilcox was obliging, and did all that could, perhaps, be expected of him; but in truth it is utterly impossible for any one to turn out a creditable piece of work from the old rickety presses at the capital; and, with the three years' unsatisfactory experience of the past, I shall strive to get the publishing of this fourth Report done in St. Louis. To enable me to do so, I hope to get your aid and encouragement.

The same rules, in printing, that have been adopted in the other Reports, are followed in this; and the reader will bear in mind that, unless otherwise stated, the latitude of St. Louis is always intended when speaking of the

season of an insect's appearance or disappearance. The older and more familiar generic names are generally employed, and the names in brackets indicate the genera to which the insect is referred in more modern systems.

Figures 35, 45, 46, 47 and 49 have been kindly loaned by Mr. Charles L. Flint, Secretary of the Massachusetts State Board of Agriculture; 51 by Dr. A. S. Packard, Jr., of Salem, Mass., and 52, 53 and 54 purchased of the same: the rest are original.

My office is still at Room 29, Insurance Building, Southeast corner of Fifth and Olive streets, St. Louis; and all letters sent to me should be thus addressed.

I thankfully acknowledge the receipt of free passes over the following railroads: St. Louis and Iron Mountain, Missouri Pacific, Atlantic and Pacific, Hannibal and St. Joseph, North Missouri, Chicago and St. Louis, Illinois Central, and Rockford, Rock Island and St. Louis.

Respectfully yours,

CHARLES V. RILEY,
State Entomologist.

St. Louis, Mo., December 2, 1871.

NOXIOUS INSECTS.

NOTES OF THE YEAR.

Of the more prominent and important of our insect enemies prolonged experience is continually teaching us something new, and of some of those already treated of in former Reports, I shall, hereafter, under the head of "Notes of the Year" bring together such additional facts and discoveries as are worthy of being recorded. These notes are therefore intended to supplement the original articles, and I shall endeavor to avoid anything like repetition of what has already appeared. By thus adding the observations of the year the original reports will be rendered more complete and circumspect.

THE COLORADO POTATO BEETLE.

In its onward march across the continent, this insect attracts, perhaps, more attention than any other. In extending over new territory we find that its enemies increase and that even its habits become more varied; while our means of counteracting its injurious work become more numerous and efficient. For these reasons it demands prominence in the "Notes."

Its Injuries in 1871.—Never before was the insect so numerous with us as last spring and summer. In March the beetle was turned up in great numbers while the ground was being plowed, especially in fields that had been planted the previous year to late potatoes. During the warm days of April they were seen everywhere sailing through the air—their striped elytra or wing-covers raised and held motionless from the thorax, while the more gauzy wings, unfolded and vibrating, reflected pleasantly to the eye as the sun intensified their rosy hues.

Before the potatoe leaves were fairly out of the ground the beetles were, as usual, after them, and the fighting on the part of potato-growers commenced with vigor, for it seemed that twenty bugs came to the funeral of every one slain. It had become very generally known that no powder unless it had Paris green as its base, was efficient enough to be of any practical

use, and consequently the demand for Paris green, suddenly became so great that the price went up from 20c. to 75c. and even $1.00 per lb. Indeed, for a while it was not to be had at all in St. Louis. Several parties in our State, taking advantage of the demand, prepared pound packages, already mixed, and advertised them for sale at 50c. per package. The price was exhorbitant, and by inducing the well known firm of Michell Bros. & Kern, of St. Louis, to prepare packages according to my recommendation, I soon had the satisfaction of seeing the price reduced to a more reasonable standard. During the latter part of May the demand for the green was at its height, and the bugs were in such force throughout the Western country, that the agricultural papers teemed with notices of it, and some writers gave loose rein to their fancy, and allowed so prosaic a subject to prompt to poetic deeds. From among the doggerel, the following taken from the columns of the *Western Rural* will bear repeating and exhibits the right spirit:

POTATO BUGS AND I.

In deadly strife we did engage;
From week to week the warfare wage
With no abatement of our rage—
  Potato bugs and I;
From two to 'leven like Falstaff's foes—
In one brief hour their number grow—
Yet neither any yielding knows
  Potato bugs or I.

Brave fought in ancient times the knight
In coat of mail and vizor bright,
But more tenacious was our fight—
  Potato bugs and I.
Armed to the teeth were foes of old,
But teeth and hands our arms all told,
Yet still we struggled strong and bold—
  Potato bugs and I.

I fought my fav'rite bulb to save,
Which to the world Sir Walter gave,
Each had our reasons strong and grave—
  Potato bugs and I.
To exterminate was what they meant,
And I toward them had like intent;
Nor one short hour would we relent—
  Potato bugs or I.

Green armor I've procured of late,
Provided by that city great
Where bloodshed seems the normal state;
And now our warfare we'll abate—
  Potato bugs and I;
For all their energy is spent,
Their spears are broken, armor rent,
And now I think we're both content—
  Potato bugs and I.

AGRA.

But if the bugs themselves were unprecedently numerous, so also were their natural enemies. I passed through potato patches where almost every *Doryphora* larva had upon the back of the neck, just behind the head, one or more eggs of its deadly parasite *Lydella doryphoræ*, Riley, (Rep.

I, Fig. 48), which is the only genuine parasite yet known to attack it; and what with the work of such natural enemies and the efforts of man, the pest suddenly became about as scarce as it had been numerous before.

All accounts agree as to the sudden diminution of its numbers in the month of June, and so far as Missouri is concerned, it did not increase to any alarming extent during the rest of the year. The disappearance was, in many sections, so thorough that it is very questionable whether man and natural enemies should alone be credited with the cause. The spring was uncommonly dry and warm, and, so far, was favorable to the increase of the insect; but the summer drought and extreme heat which followed were quite unfavorable to its multiplication. Warm, dry weather in spring is congenial to the growth and well-being of the larvæ as they swarm upon and devour our vines; but at a later stage of their lives when they have to enter the earth to undergo their transformations, a great many of them will undoubtedly die if the earth continues excessively dry and hot. They will, in short, be dried and baked to death. Those who have had large experience in breeding insects, and who understand the importance of coolness, and especially of moisture in the successful development of those which transform underground, feel perfectly warranted in such an inference, even though no systematic and accurate experiments have been made to test its validity. The extreme heat and dryness of the season, furnished a good opportunity to employ the sun-scalding remedy, and it was fully shown that in an intense summer sun, the larvæ and even the beetles will very generally die if knocked from the vines on to the dry and heated ground, especially if the vines have been well hilled; and it is doubtless because the insect cannot thrive when the thermometer ranges near 100° F. that the southern columns of the spreading army extend far more slowly than the northern. Moreover, the past summer was not the first one in which the sudden disappearance of this insect under conditions of heat and drought has been noticed; for a similar state of things occurred in 1868, and Dr. Henry Shimer, of Mt. Carroll, Ill., then attributed such disappearance to the dryness of the season.*

We are justifiable, therefore, in concluding that while dryness and warmth may be very pleasant and agreeable to the Colorado Potato Beetle in the spring or in the fall, they are nevertheless very destructive to it when intensified in the summer months.

AMOUNT OF DAMAGE CAUSED BY IT IN MISSOURI.—Notwithstanding such sudden disappearance of the potato bug, the falling off in the potato product of the State compared with 1870 is fully 20 per cent. In Illinois it is 35 and in Michigan 34 per cent.; while in most of the so-called Middle States it has increased. Much of this decrease may justly be attributed to the same heat and drought that killed off the bugs, but a certain amount of it may be attributed to the early ravages of the latter. In 1870, the Statistician, Mr. J. R. Dodge, informed me that the potato crop of Missouri was 5,525,000 bushels; and after careful estimates of the average market price in St.

* *Am. Naturalist*, Vol. III. pp. 91-99.

Louis, and of the damage done to the crop by this one insect, I showed, in a lecture delivered before the Kansas State Agricultural College, that this one pest had abstracted nearly $500,000 from the pockets of our farmers during that year. No insignificant sum to be sneered at, and well worth saving when the means are at hand!

NEW TERRITORY INVADED.—In the fall of 1870 the northern columns of the great army, in its eastward march, had reached the Canadian border and made their way some little distance into the Dominion. In the spring of 1871 the Detroit river was literally swarming with the beetles and they were crossing Lake Erie on ships, chips, staves, boards or any other floating object which presented itself. They soon infested all the islands to the west of the Lake and by June were common around London, and finally occupied the whole country between the St. Clair and Niagara rivers.

It would be difficult to indicate, with any degree of exactness, the precise eastern limit they have attained in the States; but it can be confidently stated that they have reached in some places the borders of New York and Pennsylvania. Specimens of dried larvæ were sent to Mr. A. S. Fuller of the *Rural New Yorker*, from Martinsburgh, N. Y., but he was not able to decide positively whether they were the genuine Colorado article or the Three-lined Potato beetle (Rep. I. Fig. 42). They were also reported during the summer to have obtained a foot-hold in Massachusetts, as the following item from the *New England Farmer* will show:

"Hon. M. P. Wilder informs us that this long dreaded scourge of the potato field has been found in the town of Worcester, whither it probably stole a ride on the cars of the western railroad, or was introduced by some carpet-bagger. We understood Mr. Wilder that the State Board of Agriculture were contemplating the adoption of some action with a view to 'stamping out' the pest. We are not informed as to the extent of the foothold the insect has secured, but we should certainly advise a most earnest endeavor by hand picking, by poison, by fire, and by every means in their power, to check its further extension in our State."

But I am able to say, with sufficient assurance, that no foundation whatever existed for the rumor, and that the Three-lined species was here the innocent cause of alarm. While visiting Prof. Geo. Thurber of the *American Agriculturist,* I learned that he himself had unintentionally started the rumor by mistaking certain dried 3-*lineata* for the genuine 10-*lineata* larvæ.

I have already given it as my opinion that nothing will stay its onward march. There was a possible chance of keeping it out of Ontario, but that is now lost. It might perhaps be stayed for a time, if, by some edict, no potatoes were allowed to be grown for several years within a belt of one hundred miles east of the district at present infested. But we do not live in the time of edicts, and the chances of its getting across such a belt by one way or another would always be great. So I expect this irresistible army to march on. Indeed it is quite possible that even the broad Atlantic may not stay its course; but that when once the beetles swarm in the streets of New York as they did in those of St. Louis last spring, some female, loaded

with fertile eggs and hidden in the nooks and crannies of some vessel, may be safely borne over to the land of "murphies," where she might easily found a colony which would soon spread consternation into other potato-growing countries to the eastward. In giving, through Walter Raleigh, the precious tuber to Europe, America conferred upon the Old World an everlasting boon. She may yet unwittingly be the means of bequeathing as great a bane, by sending across the ocean the deadliest enemy of that tuber! At all events, it behooves our European neighbors to be on the look-out, and to prevent, if possible, any such catastrophe.

The southern columns of the army lag far behind. In South Missouri it is gradually spreading, but has not yet touched the extreme southern counties. I saw it at Springfield in 1870 and it had then only just reached Green county. It was noticed the past summer by Mr. Wm. R. Howard for the first time in Webster, but had not then reached Taney county. It also made its first appearance in 1871 in Phelps and Reynolds, as I am informed by Dr. Thos. Ferguson of Arlington in the former, and by Dr. M. M. Kenzie of Centreville in the latter county. It also appeared in Wright, Dent and Texas, and will doubtless in time appear in all the extreme south and southwestern counties.

To the east this southern column does not reach much beyond Louisville, Ky., as I learn from Mr. T. J. Key, of that place, that it has only been there two years, and Mr. V. T. Chambers informs me that it was seen at Covington for the first time last year. Broadly speaking, therefore, it may be said to occupy more or less all the territory between latitude 37° and 46°—bounded on the west by the Rocky Mountains and on the east by a line drawn from the extreme eastern limit of Lake Erie to Cairo, Ill.

To the north the pests have extended beyond this limit in Michigan, and I have heard of them even on the northern shore of Lake Superior. An incident related to me by Jno. Hurlburt, Jr., who has been engaged in surveying and prospecting in that part of the country, will illustrate how great a distance they may extend without food, when aided by water. He found them in immense quantities on a potato patch belonging to some Indians on the Menomonee river; yet this potato patch was in a clearing of about twenty acres, with no other clearing near; and to his certain knowledge there could not have been another potato patch within one hundred and fifty miles. To the east and south they extend a little beyond the imaginary line, in Ohio, as Mr. Klippart, Secretary of the State Board, made special inquiries as to their progress, and he informed me that they have been found in every county in the State.

IT SPREADS, BUT DOES NOT TRAVEL IN THE SENSE OF LEAVING ONE DISTRICT FOR ANOTHER.—Let it not be understood that this insect, in its onward spread, or march, ever entirely quits any district where it has once obtained a foothold. This idea of its itinerant character seems very generally to prevail, and a great many people labor under the impression that soon after its advent, this dreaded foe to the potato will of its own accord take its leave as suddenly as it came—that, like every other dog, it will have its day. This idea

is rather encouraged, though I believe unintentionally, by Dr. LeBaron in his first Illinois Entomological Report, where he gives it as his opinion that the beetle will in time disappear "especially in those localities where it is most abundant, even though we leave the work wholly to Nature." Nothing could, however, be farther from the truth, or less in accordance with past experience. It may, and very generally does, prove more injurious during the first two or three years of its advent than subsequently; because time is required for its natural enemies to multiply sufficiently to keep it in check. But wherever it once obtains a footing, there it may be expected to remain for all time to come—vascillating, it is true, from year to year, in numbers and consequent power to do mischief, according as the conditions for its increase or decrease are favorable; but always present to take its chances in the great struggle for existence, and to get the upper hand if it can.

Mr. Thomas Meehan of the *Gardeners' Monthly*, writes me that while in Colorado the past summer he met with very few beetles, and that these seemed to favor the *Solanum cornutum;* and persons often wonder why the insect does not swarm in the Territory from which it takes its popular name. I have been repeatedly informed by men living on or near the Rocky Mountains, and more especially by Mr. J. Savage, of Lawrence, Kans., that at a certain altitude it scarcely ever touches the Potato, but confines itself to the wild *cornutum;* and it necessarily cannot be as numerous in thinly settled parts of the country as in parts more thickly populated. It received the popular appellation of "Colorado," not because it was numerous there, but because it was first found there by entomologists long before it had advanced to any of the Territories or States to the East. There are hundreds of insects that in like manner take their name from some particular district where first discovered, though they often afterwards prove to be far more common in other districts.

New Food; Cabbage.—It is a notable fact, and a most important one for us, that the Colorado Potato Beetle has in the past been found incapable of flourishing on any other plants but those of the Nightshade Family (*Solanaceæ*), and hitherto it has only been known to thrive upon the nightshade genus proper (*Solanum*) which includes the Egg Plant, the Horse nettle and some other wild species west of the Mississippi, such as *rostratum* and *cornutum*, which are known by various popular and local names. Upon the Nettle (*S. carolinense*), which is common with us but is mostly replaced in Kansas by the *S. rostratum*, it seems to delight even more than upon the Potato, and I have found it quite injurious to other plants of the same genus, such as the *warscewiczi, robustum, discolor* and *sieglinge*, which are often cultivated for their ornamental foliage. The other common plants of the Family such as the Tomato (*Lycopersicum*), Ground-cherry (*Physalis*), Thorn-apple (*Datura*), Henbane (*Hyoscyamus*), Apple of Peru (*Nicandra*), Tobacco (*Nicotiana*), Belladonna, Petunia and Cayenne Pepper, are not overmuch to its liking, though upon a pinch, it will feed on all of them, and especially on the first named. The Cayenne Pepper, if eaten to any extent, is actually poisonous to it, as we learn from Dr. LeBaron.

Under these circumstances it is an interesting fact (as showing how a new habit may be acquired under favorable circumstances), that last summer, this insect was positively found feeding upon the Cabbage, which is botanically so very distinct from the nightshade Family. It would be sad indeed if so all-important an esculent should in the future be doomed to suffer, with the Potato, from the insatiate appetite of such a pest, and I have no idea that cabbage raisers need fear anything of the sort. Yet stranger things have happened! and certain it is that it was found devouring cabbages by Mr. H. H. McAffee, Superintendent of the Wisconsin University Experimental Farm, while Miss Mary E. Murtfeldt, of Kirkwood, in whose testimony I can place the utmost reliance, found that in parts of Northern Illinois it did considerable injury to growing cabbages and was even breeding in great numbers upon them.

Its Hibernation.—Subsequent experience has corroborated the accuracy of the account given in my first Report, of this insect's natural history, and as some authors have since claimed that it winters in the *pupa* state, I must insist that with us it never does, but that the last brood invariably hibernates in the perfect beetle state. Specimens have been found at a depth of eight and even ten feet below the surface, but the great majority do not descend beyond eighteen or twenty inches, and many will not enter the ground at all if they can find other substances above ground that will shelter them sufficiently. The beetles are found abundantly above ground in the month of April in the latitude of St. Louis, but often re-enter it after they have once left, especially during cold, damp weather.

A few Words more about Paris Green.—A good deal of objection has been raised against the too general use of this poison, and perhaps with some reason. Mr. H. H. McAfee, who has had a good opportunity of testing its value, strongly opposes its use on the grounds of its dangerous nature, and shows in the following paragraph, which is from his pen, that the bugs can be subdued by determined hand-picking.

With an astonishing large supply of beetles to start on this spring, we have fought them through to this time at an expense of just $20.15, and we have dug potatoes enough to pay, at market price when dug, for the seed upon the whole plat, also to pay for the picking of the bugs, and a profit of $6.51, and there yet remains to be dug over half the potatoes, which, after paying cost of cultivation and rental, will give a fair profit. There will be a slight bill for picking bugs from this on, for the late potatoes, but we are perfectly sure of a balance of profits, if the potatoes now in the ground never grew another ounce. "Early Rose," yielded at the rate of 232.56 bushels per acre, "King of the Earlies," at the rate of 157.24 bushels per acre. I feel sure that we can count on several million less bugs to winter over, than were on the farm last fall, and I believe that the expense of gathering them another year may be lessened more than three-fourths, by using proper implements for that work.

Some persons have even imagined that potatoes grown on land where it has been used are often watery, rank and of bad flavor, and according to the Monthly Report from the Department of Agriculture for August and

September last, peas planted in soil mixed with the green rotted immediately and would not germinate, while those in unadulterated soil grew finely and flourished, but died immediately when transplanted into the soil mixed with the green. How far these statements are to be relied on, each one must judge for himself, but it is certainly advisable to avoid as much as possible the use of the poison, by carrying out the other methods, both preventive and remedial, advocated in previous Reports; for wholesale remedies always have the disadvantage of destroying some friends with the foes, and in this case the true parasite and those cannibals which by mastication partake bodily of their green-covered prey, certainly fall in the general slaughter. But this remedy has now been so extensively used with good results and without any apparent harm to the tubers, that full and thorough proof against it will be necessary to cause its abandonment. Properly mixed I have used it without the slightest trace of evil effect on the leaves or tubers, and I know hundreds of others who have done likewise; so that with present experience I should not hesitate to recommend its judicious use. What is wanted on this subject, is a long series of thoroughly accurate and reliable experiments. Let our Agricultural colleges make them! Meanwhile Paris green will be extensively used, especially while the vines are young and most need protection; for after the expense of preparing the land and planting has been incurred, it will not pay to get discouraged and abandon the field to the enemy, when such an efficient remedy is at hand. We must take lesson from one of Æsop's instructive fables, and instead of relying on providence to help us out, put our shoulders to the wheel and help ourselves out of the difficulty.

The green may be shaken over the vines in various manners, and some persons have found an old sleazy sack, such as those used for table salt, to do good service, when attached to the end of a stick. It is most safely applied, however, by aid of a perforated tin box attached to the end of a stick three or four feet long. Such a box (Fig. 1) I induced Messrs. Michel Bros. & Kern to manufacture last summer. It can be made of any desirable size. The least possible dusting suffices, and by taking the handle of the dust-box in the left hand, and then tapping the box with another stick held in the right hand, one can walk rapidly along the rows and regulate the amount sifted. The green cannot well be mixed with the flour or plaster except by the aid of a mill, and it is for this reason that those who mix in large quantities have the advantage. It is most effectual when mixed with flour, though plaster has the merit of cheapness. I have generally used and have hitherto recommended from 12 to 15 parts of flour to one of green, but it has been abundantly demonstrated that, if the green be pure, it may be diluted with 25 or 30 times its weight and still be effectual.

[Fig. 1.]

Abundantly as this mixture has been used, I have not been able to learn of a single authenticated case of poisoning resulting in death, except

where it was left exposed in quantity so as to allow animals to get at and eat it. A few cases of slight poisoning of the skin have occurred, and these might have been avoided; and perhaps I cannot better illustrate how small is the risk of its judicious use in the field with the precautions given in my last Report, than by the following circumstance which came under my notice: Two young men of St. Louis—Messrs. August Reitemeyer and J. Fleming—were daily engaged, through the greater part of the month of May, in preparing the mixture for the market. They became unnecessarily careless in their work, and were actually living in an atmosphere heavily charged with the dust, while their clothing was saturated with it through and through. Yet they experienced no ill effects from it till about the first of June, when the weather became so warm that they begun to perspire.

These facts should, however, form no excuse for the careless use of the poison, and it is well to know that it must be especially guarded against during the heat of the day. It should, in fact, always be dusted in the cool of the morning while the dew is on the plants.

At a meeting of the N. Y. Farmer's Club, I made the acquaintance of Dr. Richard Scuppernong, who has had much experience with Paris green, having been engaged in its manufacture with the firm of C. T. Reynolds & Co. of that city. Manufacturers would rather make and sell at 25 cents per pound in winter than to make it at 40 cents per pound in summer, the skin being so much more susceptible to its effects, during the latter season. Men do not ordinarily work at its manufacture continuously more than a week at a time, and every one in the factory is obliged to take an occasional antidote. Those who contemplate using it on their potatoes would do well to procure a supply in the winter time, as they would thus save money. Very much depends on the quantity obtained, and none but that of a deep bright green should be bought, as the paler brands are weaker and adulterated.

Antidote for Paris Green.—The antidote for Paris green poison is hydrated sesquioxide of iron. Nearly every druggist keeps it always on hand. If it cannot be bought it may be prepared thus:—Dissolve copperas in hot water, keep warm, and add nitric acid until the solution becomes yellow; then pour in ammonia water—common hartshorn—or a solution of carbonate of ammonia, until a brown precipitate falls. Keep this precipitate moist and in a tightly corked bottle. A few spoonfuls taken soon after even a bad case of poisoning with Paris green or arsenic is a perfect remedy. Every farmer who uses Paris green for the bugs should keep this medicine always in his house.

Other Applications.—One would naturally suppose that since arsenic forms one of the principal ingredients of Paris green, it would also kill potato bugs, with the advantage of being much cheaper. With a view of ascertaining its value I tried it last spring, but with no satisfactory results. I also tried powdered cobalt which is so generally used to kill flies, and it likewise failed to kill with anything like the certainty which Paris green does. White hellebore has been recommended by those who claim to have

been benefitted by its use; and Mr. Hay, gardener at the Illinois Institution for the Education of the Deaf and Dumb, says that he has found that black pepper and ashes in the proportion of a pound of pepper to the pail-full of ashes, is an infallible remedy. How reliable this last may be, can be ascertained next year, but at present I can safely recommend nothing but the mixture of green.

From a series of experiments made last summer by Messrs. Wm. Saunders and E. B. Reed, of London, Ont., who were directed by the Agricultural Department to institute them, we also learn the great advantage of the green; and as the results of these experiments are interesting and important, I quote herewith those obtained with other chemicals:

Arsenious Acid (Arsenic).—This chemical being much cheaper than *Paris Green*, and more uniform in its composition, we hoped it would have proved a practical and safe remedy. We tried it in the proportions of half ounce, one ounce and two ounces to a pound of flour, and while we are not prepared, from the few trials we have made, to entirely disapprove of its use, the results we have obtained point to the conclusion that where it has been used in sufficiently large proportions to destroy the insect, it has caused more or less injury to the leaves. In cases where *Paris Green* is not obtainable, this might be used as a substitute, in the proportion of one ounce to one pound flour, which should always be colored with some black powder, such as charcoal or black antimony, so as to lessen the risk of accident from its use.

Another Arsenical compound was also tested, known in commerce as *Powdered Cobalt* or Fly Poison; this was used in the same proportions as the last mentioned, and with similar results, but owing to its higher price we do not recommend it for general use.

Sulphate of Copper (Blue Stone).—A strong solution of this salt was tried in the proportion of two ounces to one gallon of water, and showered on the vines with a watering pot, without damage to either the insect or the plant.

Bichromate of Potash.—This is a poisonous substance largely used in dyeing, and one which has attracted some attention in France of late, as a remedy for insects. We used it dissolved in water in the proportion of two ounces to three gallons of water. This killed the insects effectually, but at the same time destroyed the plants. Whether, in a more diluted form, this remedy could be effectively used without injury to the foliage, we are unable at present to say, but shall experiment further with it.

Powdered Hellebore.—This powerful irritant which is so effectual as a remedy for the *Currant Worm* we tried without perceptible effect, both in powder and also mixed with water, in the proportion of one ounce to the gallon of water. Several other poisonous substances were also used with like results.

Carbolate of Lime.—There are several preparations sold under this name, which we found to vary much in composition and character, and equally so in effect. We tried an article known as Dougall's without any good result, but succeeded better with one prepared by Lyman Bros. of Toronto, a black powder manufactured, we understand, from coal tar. This destroyed a large proportion of the larvæ, but we doubt whether it would kill the perfect insect; it is, moreover, used in an undiluted form, which would render its cost greater than that of the *Paris Green* mixture, so we see no advantage in using it, although the fact of its being less poisonous may induce some to try it who are prejudiced against *Paris Green*.

Ashes and Air-slacked Lime, we found, had been extensively used by

many of the farmers on the frontier districts, but, as far as we could see or learn, without any perceptible results.

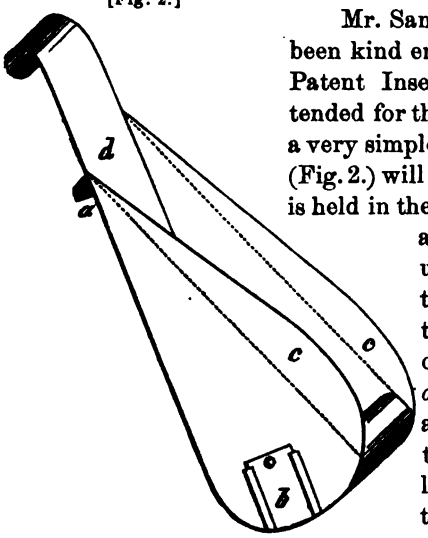
I last year showed how futile it is to use elder leaves as a remedy; but it is so easy for persons who are not thoroughly posted as to the habits of this insect to form wrong conclusions about the efficacy of whatsoever application they may make to the vines, that we this year find the sprinkling of a decoction made from Dog fennel, or from the root of the May apple or Mandrake (*Podophyllum peltatum*) strongly recommended for the same purpose. Mr. John Oliver, of Glencoe,—determined to fully test the latter—went to considerable trouble and expense to procure a sufficient quantity of the May apple decoction; and after thoroughly trying it, he informs me that it had no effect in killing the bugs. Even were these methods successful, they could not be everywhere employed, and must always prove more expensive than the Paris green.

We learn from the *Prairie Farmer* of Chicago, that an intelligent Russian gentleman of that city employs the following method:

He takes finely pulverized, air slacked lime, commences at one end of the field and scatters it over the vines for the distance of about ten rods. In the course of the day, if the lime is applied in the morning, the bugs nearly all betake themselves further down the rows where no lime was scattered. The next day he scatters lime on the vines for a like distance, and thus continues day by day, till the bugs are driven on to a small area, when they are destroyed by Paris green or by other means.

MECHANICAL MEANS.—Various contrivances have been devised for knocking the bugs off the vines. Mr. Geo. Squires, of Montgomery, Ill., as I am informed by Dr. LeBaron, built a machine to be drawn by horses, which worked very effectually the past summer. It is a modification of that of Mr. Benson, of Iowa, described in my first Report, being a simple box six inches high, with wheels to which brooms are attached to sweep the vines—the brooms circling towards the box.

[Fig. 2.]



Mr. Samuel Creighton, of Lithopolis, Ohio, has been kind enough to furnish me with an "Improved Patent Insect Destroyer," which is especially intended for the potato bugs. It is a hand machine of a very simple nature, and the accompanying outline, (Fig. 2.) will give a very good idea of it. In using, it is held in the right hand by the handle *a*, and placed at one side of the potato hill, with the upper end more or less inclined, according to the size of the plants. In this position the lower branches of the plants will overhang the forward edge of the plate *d;* and the flanges of the sides, *cc*, which are slightly bent outwards, will embrace the second and third sides of the vines, leaving the fourth exposed. The operator then strikes this exposed side, with a

light, flat and broad broom, thus detaching the bugs which fall to the bottom of the trap. Whenever the trap is filled the bugs are emptied out through a sliding door *b*, and destroyed in whatever manner the operator sees fit. A good size for this trap is 2 1-2 feet in height; 15 inches from flange to flange and 7 inches across the narrow way of the pocket. It should be made of tin or, if of wood, the pocket should be lined with tin; as when kept smooth or moistened with oil or water the bugs cannot easily crawl out, as one goes from hill to hill. This contrivance is but an improvement on the common tin pan, and its principal merit lies in its simplicity and cheapness.

The great difficulty with all mechanical contrivances of this kind, lies in the fact that they can only be used when the vines are of a considerable size, whereas the enemy must be most persistently fought from the moment the ground parts to give way to the sprouting tuber, until the plants are a few inches high. Hence the great advantage of Paris green.

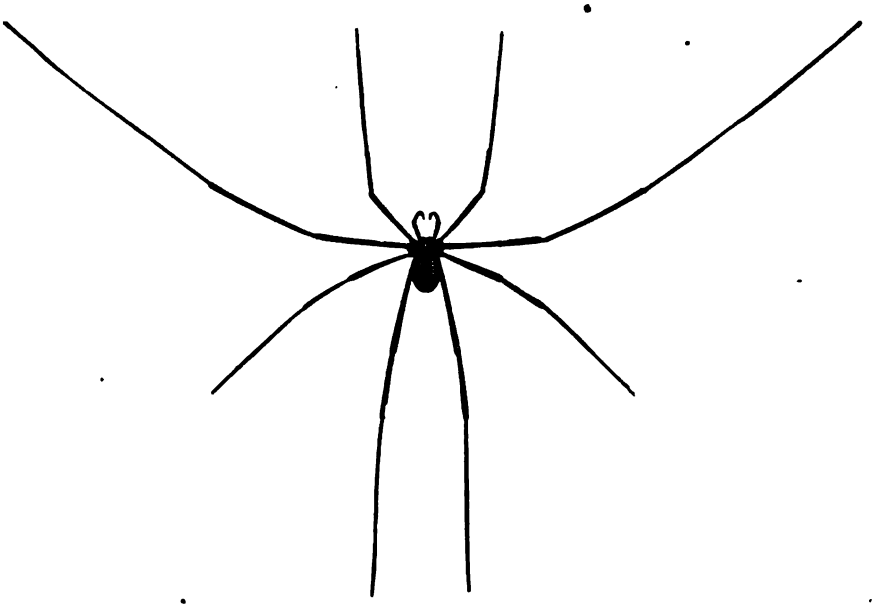
A cheap, rapid and effective method which commends itself to the good sense of every one, is for one person to go along the rows with a short-handled broom and by quick motions knock all the bugs off, while a second person follows immediately after, dragging by a single horse a heavy bundle of brush, or close-toothed harrow made for the purpose. Some of the bugs will escape being killed, and a few of the younger larvæ may not be knocked off; but the operation is so rapidly performed that it will bear repetition as often as neeessary.

NATURAL ENEMIES INCREASING.—To those who have carefully watched the eastward progress of this insect, the manner in which its natural enemies have increased in number and kind is interesting and significant. In previous Reports fourteen cannibal or parasitic insects, specially observed to attack it in one state or another have been figured, and I am now able to add seven more to the list. The toad, and perhaps some other reptiles devour them, and among birds the crow has been observed to do so. Among domesticated birds, the duck was for several years the only species that would touch it, and chickens for a long time would invariably give it the go-by. Last year I stated that chickens had learned to eat the eggs, and had even acquired a taste for the young larvæ; but this year cases are numerous, in various parts of the country, where the beetles, as well as the larvæ and eggs have been devoured by them. I know of one case near St. Louis where, with a few specimens of the common May Beetle, no less than thirty-one perfect specimens of the Colorado Beetles were found in the crop of one chicken; while in another instance, in the same neighborhood, the chickens forsook every other kind of food for these nauseous insects. In these instances the chickens have taken naturally to the new food, but it has been shown (See Dr. Brown, Trans. Ind. Hort. Soc., 1871, p. 81) that they may easily be taught to like it, by first shutting them up and, after denying them all animal food for about ten days, turning them into an infested potato field and keeping them there. Indeed, coops may be taken into such a field, and young chickens raised there to good advantage. To these birds we may also add that blithe and pretty field companion whose

services as an insect devourer have been altogether too much underrated—the common quail. A correspondent of the *Rural New Yorker* from Onargo, Ill., found six Colorado Potato Beetles in the crop of one that was killed on his place. Among quadrupeds, Dr. LeBaron has shown good reason for believing that the skunk likewise preys upon them. As it is also known to destroy great quantities of the common White Grub, and to clean tomato patches of the Tomato Worm, this much abused beast in a measure compensates for its well known disagreeable attributes.

Among spiders we may mention an undetermined species of *Phalangium* (Fig. 3 represents *P. dorsatum*, Say). These animals are popularly

[Fig. 3.]

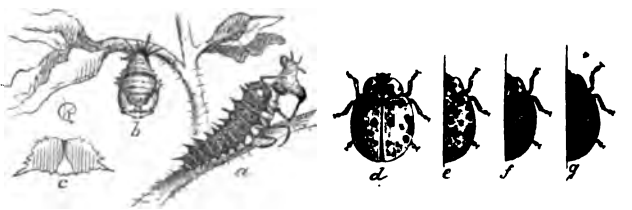


called "Grand-Daddy-Long-Legs" in this country, but are also known as "Harvest-men" and "Grandfather-Gray-Beards," in some parts. They all have similar habits, being carnivorous and seizing their prey very much as a cat seizes a mouse; but they differ from other spiders in that they bodily devour their victims, instead of sucking out their juices. They are known to devour great numbers of plant-lice, and Mr. Arthur Bryant, of Princeton, Ill., found them devouring the larvæ of our Colorado immigrants.

But the most important of our auxiliaries to be added to this list of natural enemies of the *Doryphora* are to be found in its own Class. They consist of the following species:

THE 15-SPOTTED LADYBIRD.—This may be known as the large 15-spotted

[Fig. 4.]



Ladybird (*Mysia 15-punctata*, Oliv.) It is the largest of the ladybirds that we have, and the only other species of the Family in this country that is larger, is the Northern Squash-beetle (*Epilachna borealis*)—a species which has the wing-covers spotted in a somewhat similar manner, but which I have not yet met with in Missouri. The 15-spotted Ladybird is a very variable insect, and at *d*, *e*, *f* and *g* (Fig. 4), are represented four of the more striking forms. In the more common form the thorax is cream-colored and the wing-covers cream-colored, with a tinge of chocolate. In this form (*d*) the black spots and marks are conspicuous. In the next form (*e*) the thorax remains the same, but the wing-covers are chocolate-brown and the black spots are surrounded with a paler brown annulation. In the third form (*f*) the thorax is a little darker, and the wing-covers so dark that the spots are scarcely perceptible; while in the fourth form the whole insect is of a uniform deep brown-black color.

The larva of this beetle (Fig. 4, *a*) is jet black, with six rows of long spines and six long black legs. It has a paler yellowish stripe along each side, intercepted by two bright orange spots behind the legs, and there is also an orange spot on the back of the flattened first joint (*c*). I found this black fellow devouring the young potato bugs last May at Allenton, and my friends E. B. Reed and Wm. Saunders, of London, Ontario, have found the beetle at the same commendable work in Canada. When about to change, this larva fastens itself to the plant and changes to a cream-yellow pupa, marked with black, as at Figure 4, *b*.

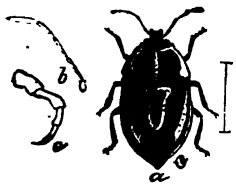
THE ICY LADYBIRD.—This species (*Hippodamia glacialis*, Fabr.) which was doubtless so named from occurring so far north, where it is often found under ice and snow, has likewise been seen in great numbers carrying on the same commendable work. Figure 5 represents it of the natural size, the wing-covers being of a bright orange-red, each marked behind with three black spots, the two upper of which are confluent. The head and thorax are black marked with cream-yellow as in the illustration. The species is closely allied to the Convergent Ladybird (differing principally in being nearly twice as large, and in lacking the spots on the anterior portion of the wing-covers), and will be found to have similar transformations.*

[Fig. 5.]

THE RING-BANDED SOLDIER-BUG.—The third of these new friends of the

* See 1st Rep. Fig. 52.

[Fig. 6.]



potato grower is a prettily marked insect—a genuine Bug—belonging to the same extensive group (*Scutellera* family) of the true Bugs (*Heteroptera*) as the Spined Soldier-bug, which is now so well known for its efficiency in thinning out the ranks of our potato pest, and which was illustrated in my first Report (Fig. 54).

The Ring-banded Soldier-bug (*Perillus circumcinctus*, Stål.) which is illustrated at Figure 5 (*b* showing an enlarged view of its antenna and *c* of the beak with which it sucks the juices of its prey), is of a rich polished brown color, marked as in the figure, with pale yellow. Underneath, on the venter, there is a large yellow patch containing four black spots quadrangularly arranged, and there is a border of yellow extending around the edge of the whole body. It is a not uncommon species in Missouri, and was found by Mr. Reed, of London, Ontario, preying voraciously upon potato bugs.

These three species are so conspicuously marked that they can be easily recognized. Wherever found let them be kindly dealt with!

The fourth species to be added may be popularly known as

THE DOTTED-LEGGED PLANT-BUG.—This insect (*Euschistus punctipes*, Say,

[Fig. 7.]

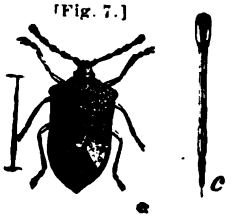
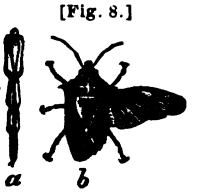


Fig. 7) is minutely speckled and of an ochre-yellow color, and so closely resembles the Spined Soldier-bug that I reproduce the illustration (Fig. 8) of this last to contrast with it. The most obvious features whereby to distinguish these two insects are those furnished by the figures, namely, the more flattened form of the Soldier-bug (Fig. 8) and especially of its squarish head, compared to the Plant-bug (Fig. 7); and the sharp-pointed thorax of the former compared to the more rounded thorax of the latter. This last character is variable, in both, so that specimens of the former occur with the thorax rounded, and of the latter with it more pointed; but there are two other structural differences which are always constant and can always be relied on to distinguish the two insects. If the Spined Soldier-bug be examined underneath, its beak (Fig. 8, *a*) will be found to be quite stout, especially at the base, and between the hind legs at the base of the venter, a prominent tooth pointing towards the head will be noticed. This last feature is entirely absent in the Plant-bug; while the more slender beak (Fig. 6, *c*) of the latter, the average larger size, the black-dotted legs, and the absence of the opaque brown streak at the transparent and glassy tip of the wing-cases, or hemelytra, combine to distinguish it still further from its more ferocious simile.

[Fig. 8.]



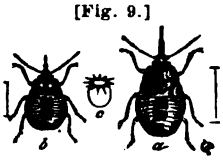
The Dotted-legged Plant-bug has heretofore been considered a purely vegetable feeder, and its being caught partaking of more carnivorous food must be considered exceptional. It is however an interesting fact, entomologically considered, and shows that the carnivorous is not so widely separated from the herbivorous habit as we are wont to suppose. Many other

facts of a similar nature might be cited, some of which have been already mentioned in these reports; and it has long been known to entomologists that Bugs of this particular *Scutellera* family which normally are plant-feeders, will yet attack other soft-bodied insects when opportunity offers.

According to Dr. LeBaron, there is some evidence, not yet sufficiently conclusive however, that the Tarnished Plant-bug (Rep. II, Fig. 83) also feeds on the Doryphora larvæ.

While touching upon the Spined Soldier-bug, it will be well, perhaps, to state that though, with all true Bugs, its larva and pupa are active, and have the same habits and general form of the mature insect, yet they differ so much in coloration and pattern, that they are scarcely ever properly identified and have often been sent to me as a new Potato bug enemy by those who have found them boldly carrying out their naturally voracious instincts.

[Fig. 9.]



The eggs of this Soldier Bug, as I have good reason to believe, are pretty little bronze-colored, caldron-shaped objects, with a convex lid, around which ciliate fifteen or sixteen white spines (Fig. 9, *c*). They are neatly placed side by side in clusters of a dozen or more, to leaves and other objects, and are so much subject to the attacks of a minute Hymenopterous parasite, that those who undertake to hatch such as are found out of doors will more often get flies than bugs. The newly-hatched bug is ovoid, and shiny black, with some bright crimson about the abdomen. In the full grown larva (Fig. 9, *b*) the black still predominates on the thorax but some four yellowish spots appear, and the abdomen becomes more yellowish, though still tinted with red. In the pupa (Fig. 9 *a*) which is readily distinguished by the little wing pads, the ochreous-yellow extends still more, and finally, with the last moult, the black disappears entirely, in the perfect insect. Throughout the immature stages the shoulders are rounded, and not pointed, and the antennæ or feelers have but four joints instead of five as in the mature bug, while there are but two visible joints to the feet or tarsi instead of three. *

We have been taught to admire the muscular power of the lion, which is enabled to grip and toss an animal larger than itself with its powerful neck and jaws; but feats performed by these young Soldier Bugs, throw the lion's strength completely in the shade, for they may often be seen running nimbly with a *Doryphora* larva, four or five times their own size, held high in air upon their outstretched beak.

---

* These facts do not seem to be generally known, but I believe it will be found a very general rule that in the larval and pupal states, all the *Scutelleridæ* have one joint less to the antennæ and tarsi. Westwood mentions the fact with reference to *Pentatoma rufipes* of Europe, but, so far as I am aware, it is not mentioned by Douglas & Scott, Amyot & Serville, or any other authors. With regard to the tarsi, the small third joint may perhaps be detected upon dissection, especially in the pupa, but the antennæ are never more than four-jointed in such species as I have had opportunity to study in the preparatory stages, namely, *Arma spinosa*, Dallas; *Brochymena annulata*, Fabr.; *Stiretrus fimbriatus*, Say, *Euschistus punctipes*, Say. It is the second joint of both the antennæ and the tarsi, in the larva and pupa, which elongates and divides in the perfect insect. [Since the above was written, I have had the pleasure of examining Mr. Uhler's collection of Hemiptera at Baltimore, and I noticed that the same trait occurs in the larva and pupa of *Rhaphigaster* and *Nazara*. Mr. R. had also noticed this physiological peculiarity of the *Scutelleridæ*.

The fifth additional enemy of our Potato bug is the NEBRASKA BEE-KILLER (*Promachus Bastardii*, Loew.) * This active and savage two-winged fly was observed by Mr. A. R. Whitney, of Franklin Grove, Ill., to seize and carry off the mature beetles, as we are informed by Dr. LeBaron. The Missouri Bee-killer (*Asilus Missouriensis*, Riley) would doubtless do likewise, though the fact has not yet been observed; and neither of these flies would be likely to kill Potato bugs enough to atone for their pernicious bee-killing propensities.

The sixth is the Kansas Bombardier beetle (*Brachinus Kansanus*, Lec) —an insect bearing a general resemblance to the Great Lebia (3d Rep., Fig. 41) but being one-third larger and more lengthened, and with the wing-covers of a duller, less polished blue. The beetles of this genus all have the power of discharging from the anus, when disturbed, an acrid fluid of so volatile a nature, that upon coming in contact with the air, it tenuates with an explosive noise and pungent smell, and hides the beetle in a bluish vapor which enables the little artilleryman to effect his escape. The species in question, was found attacking the Colorado Potato bug larvæ, by Mr. Thos. Wells, of Manhattan, Kansas, who furnished me with specimens for identification.

Lastly, we may add a species of Rove-beetle, belonging to the genus *Philonthus*. An undescribed species of this genus was found by Dr. Shimer maliciously killing the *Doryphora* larvæ in one of his breeding cages. There is no evidence yet, however, that it follows the same habit when free in the field. The particular species noticed by Dr. Shimer was in the Walsh cabinet, which was destroyed in the great fire at Chicago, but to give the reader a correct idea of this genus of insects I present a figure of *Philonthus apicalis*, Say (Fig. 10). The larvæ are active and voracious and bear considerable resemblance to the perfect insects. Figure 11 is taken from Westwood and shows that of *Goerius olens*. The pupæ are quiescent and incapable of motion, all the parts being soldered together and encased almost as firmly as in the chrysalis of a butterfly. The head and pro-thorax are suddenly bent forwards, the former touching the breast; and the back is curiously flattened. Figure 12 represents the pupa of an allied insect* found in the ground and from which I bred *Quedius molochinus*, Grav. The rove-beetles are, as a general rule, carrion feeders, preying voraciously on decaying animal and vegetable substances; but some of them are true cannibals, while a few are even parasitic. Indeed they are no doubt more carnivorous than is generally supposed.‡

[Fig. 10.]

[Fig. 11.]

[Fig. 12.]

Thus we have twenty-one enemies of its own Class, that have

* See first Rep., p. 168, and second Rep., p. 122.

† This pupa is yellowish-brown in color. Dorsum perfectly flat with the sides compressed and narrow-edged. First abdominal joint with a lateral spine; second with a larger, blunter, rounded tubercle; each of the others with a stiff bristle: apical joint with two converging thorns. Abdominal joints 2, 3 and 4 with a tubercle each side of dorsum.

‡ It is well known that these larvæ are difficult to rear to the perfect state, and one reason no doubt is that they are often sdephagous in habit, and are too generally treated as rypophagous

actually been observed preying on the Colorado Potato-beetle, a round score of which have been figured; but the one true parasite is undoubtedly more efficient than any of the others.

THE CODLING MOTH, AGAIN.

A few additional and important facts in connection with the management of this insect, have come to light during the year just past, and are worthy of record.

TIME OF YEAR THAT THE FIRST MOTHS APPEAR.—To make the statement answer for any latitude, what was said in my first Report may be safely relied on, namely, that the moths begin to appear as soon as the apple trees are in bloom. Egg-laying commences soon after apples form. Of course, the time of blossoming varies slightly with the variety; but the time of issuing of the moths varies still more, so that the statement holds good. As the seasons vary from two to three weeks, or even a month, in relative earliness, and as the appearance of the moths varies accordingly, the futility of giving exact dates becomes apparent.

TIME REQUIRED FOR ITS DEVELOPMENT.—Having bred some moths nearly every year for ten years, in different localities, I can safely give the following as the average length of time required in the adolescent stages of the first brood; but which, of course, do not hold good in the second brood, which hibernates:—Egg state, 4—10 days; larva or worm state, 25—30 days outside and 3 inside cocoon; pupa state, 12—18 days. Little can be gained by isolated experiments, because the length of time required varies according to the state of the atmosphere, temperature, etc.

PROPER TIME TO COMMENCE APPLYING THE BANDAGE AROUND THE TREE.—I have heretofore given the first of June as the proper time to commence applying the bandages, but late experience would lead me to advise their application nearly two weeks earlier. For reasons already stated it is difficult to give dates with any degree of accuracy, and the best advice that can be given is to have the bandages on the trees about a week after the first Wilson's Albany strawberries are ripe. It is of no use to put them on earlier with a view to entrap the moths, as I am convinced that these cannot be entrapped in sufficient numbers to make it pay. The bands should be removed and the insects destroyed at least once a fortnight from this time till the apples are all off the tree.

IT ATTACKS PEACHES.—Last year (3rd Rep. p. 103) I gave reasons for believing that this insect had attacked peaches in some parts of the State, and had, according to Mr. Huron Burt, infested three-fourths of the crop around Williamsburg. I am now able to say positively that the insect mentioned is the genuine Codling Moth, as Mr. Burt has since furnished me with specimens of the worms. Thus, we have a second example in this

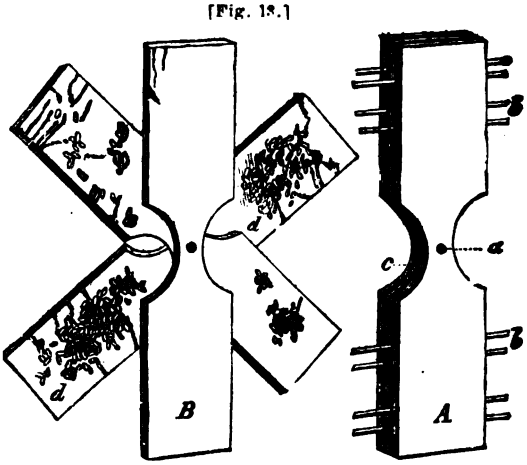
Goerius olens of Europe is noted for its rapacious character, and *Philonthus* may now be included in this category. Westwood (Int. II, p. 164) cites *Velleius dilatatus* as parasitic in the nests of *Vespa crabro*, and other small species of the genera *Dinarda* and *Lomechusa* as residing in the nests of ants. Mr. Fred. Smith (ibid, p. 365, note) found a species of *Megarthrus* parasitic on the larva of *Saperda populnea* while *Aleochara anthomyiæ*, Sprague (Am. Ent. II., p. 370) is parasitic in the larvæ of *Anthomyia brassicæ*.

same species of an insect normally confined to pip-fruit, all at once taking to stone-fruit, and thus acquiring a new habit. Yet, so far as we now know, the stone-fruit-feeding branch is yet confined to plums around London, Ont., and to peaches around Williamsburg, Mo.

THE KIND OF BANDAGE THAT IS BEST FOR THE PURPOSE.—There has been some difference of opinion as to the best form of bandage to be used. To be thoroughly effectual and durable it should be sufficiently firm in texture that it cannot be too easily cut through by the jaws of the worm, or drawn in folds and wrinkles by its silken threads. A stout and narrow piece of cloth or canvas, drawn around and fastened to the tree by a tack, is perhaps the simplest form of bandage and the most quickly fastened. Mr. Jas. Weed of Muscatine, Iowa, (Western Pom. Sep. '70) uses strips of cloth 1 1-2 inches wide. But every one must decide for himself what will be cheapest and most expedient, according to the extent of his orchard and the facility with which he can procure rags, cloth, haybands, or other substances. A good bandage, ready made, is greatly needed in the country, and if some enterprising firm would manufacture canvas strips about six inches wide, lined on one side with four inches of tow, cotton wadding, or some other loose material, and would put it upon the market at a reasonable price per yard, there would be an unlimited demand for it. Such strips would last for years, and could be cut of any desired length, drawn around and tacked, with little labor, to each tree; while, by smearing with tar or molasses, it might also be made to do good service, after the apple worm season, in those orchards infested with the Canker-worm. The advantage of the looser, thicker inside lining (which should however be closely and compactly pressed) would be that it would enable us to fill up all the inequalities of the bark, so as to absolutely prevent the young Canker-worms, as well as the moths, from ascending; and at the same time it would furnish a most enticing substance for the Apple-worm to spin up in.

NEW METHODS OF TRAPPING. THOMAS WIER'S APPLE-WORM TRAP.—Mr. Thos. Wier of Lacon, Ill., has hit upon a very simple device for alluring the worms, which is destined to play an important role in counterworking their injuries. In conjunction with his cousin, Mr. D. B. Wier, he has patented the trap, and though I do not think that the patenting of such simple devices is quite in accordance with a progressive horticultural spirit, or that the patentees will find it a very profitable undertaking, they have a perfect right to think otherwise.

[Fig. 18.]



It was too late in the season when the trap was brought to my notice, to give it a thorough trial, but I was at once very favorably impressed with its usefulness, and what little I have seen of its work has not altered that impression.

The trap (Fig. 13, A closed, B open,) consists simply of two, three or more thin pieces of board, 12 to 20 inches in length, and 2 to 4 inches wide, with a screw (*a*) through their center. The screw must be long enough to be firmly driven into the trunk of the tree, so as to hold the boards in position. The boards are cut out on each side of the screw, as at *c*, to facilitate their separation when fastened together by the silken threads of the worms, and so as to better expose the latter when the trap is opened.

The advantages of this trap, to my mind, may briefly be stated as follows, and I think they so far outbalance the disadvantages that it may be considered the best trap we yet have: It is cheap, accessible to all, easily placed on the tree and removed again; wood forms, perhaps, the most natural covert for the worms; the traps may be collected with little trouble by the barrowfull, submitted to a killing heat, in one way or another, and replaced again; they may be used on the ground as well as on the tree. Its disadvantages are few. One it has in common with all other snares or traps for this insect, namely, that it can never *exterminate* the Codling moth, for the several reasons given in previous Reports. Another is that where one only is used it can be attached to but one side of the tree, and in this single respect, notwithstanding all the theories of my friend Wier, it must always be inferior to any trap that encircles the tree.

The worms will spin their cocoons between the inner shingle and the tree as freely as between the shingles themselves, and I suspect that it will be found less tedious and cheaper to detach the traps and kill the worms by wholesale, than to open them on the tree. Those who prefer the latter method, will be pleased to learn of the means described by Mr. D. B. Wier, who says: "The quickest and best way to do this is to have a large tin pan bent in on one side, so as to fit closely to the trunk of the tree. When you reach the tree drop upon your knees, place the depression in the pan against the trunk of the tree, hold it there by pressing your body against it, and you have both hands free to open the trap. When opening it many of the pupæ or chrysalids will fall into the pan and some of the worms. Kill the rest or scrape them into the pan. The trap must be turned clear around, as many will be found between it and the bark of the tree. A person will open and kill the worms in from 400 to 800 traps in a day."

The inventor informed me that he believes his trap is more apt to come into general use by being patented, than if offered without price to the public. If in his hope to realize a fortune from it, he sends out agents among the fruit-growers of the country, I am not sure but he is correct; especially if such agents are enabled, by proper circulars giving a true and condensed history of the Codling moth, to disseminate important information. But the danger is, that patentees are sure to claim too much for their pet creations. This fact is well exemplified in the present instance, for already

Mr. Wier absurdly claims that all the worms descending a tree will be enticed to the side where the trap happens to be fastened, and the label pasted on such of the traps as have so far been sent out, commences as follows:

THOS. WIER'S

APPLE WORM

AND

CURCULIO TRAP,

Which catches Apple Worms, Curculio, and every species of insect infesting Fruit.[*!!!*]

The love of gain obscures the light of truth; and this wonderful power of a pair of shingles to catch "every species of insect infesting fruit," is altogether too much like Mr. Quackenbosh's patent universal, never-failing Elixir which cures all diseases that possess mankind! It will not deceive the well informed, but the glittering of its panaceal power may lure the unsophisticated.

Other evils will likewise result from the sale of this trap under such spurious claims, and without some explanation of the insect's habits. One of them may be illustrated by the following dialogue, which is not altogether imaginary, but is founded on an actual occurrence: Agent Gaingreedy—his desire to sell rights being stronger than his love of accuracy—meets farmer Glauball, and straightway expatiates upon the merits of the patent trap. He shows how the worms gnaw their way in between the shingles, and how easily they may be destroyed. "Ach," cries the credulous German, "und is it treu das de wurm rader eat de schindel als de apfel." "Oh, yes," says Gaingreedy, "screw one of the traps on to this tree, and in a week I will come back, and you will see." At the expiration of the week, the trap is opened, and upon viewing with wonder the worms that have secreted in it, Glauball rapturously exclaims, "Mein Gott, das ist de best ting I yet see," and purchases the right to use much quicker than he would if he knew that the worms had already been in his apples.

It may be claimed that so long as men can be induced to use the trap, and kill the worms regularly, it matters little whether or not they understand the philosophy of its use; but, barring the principle at stake, the spread of error can never be fraught with any continued good; and as errors on this subject are continually creeping into our best horticultural journals, it becomes patent that it is not the credulous German alone who needs correct rather than bogus information.

I have thus indicated the mischief that may be done by over-estimating the value of this trap, in order that the patentees may strip it of all appearance of sham, and present it to the fruit-grower for what it is—a very useful and important device—and not extol it as a sure Codling moth exterminator.

JARRING.—It is well known to all those who have had any experience with this insect, that the young apples infested with the early brood of larvæ fall much more readily from the tree than the more mature apples infested with the later brood. This fact has been denied by those whose

interests incline them to theorize in a different way, but the bushels of windfalls that cover the ground early in the year, under trees that are badly troubled with the worms, are sufficient attestation of the fact. Working upon this well known fact, Mr. Oliver Chapin, of East Bloomfield, N. Y., has been in the habit of jarring down these windfalls and then collecting them together and destroying them. He has been able by this means to preserve the fruit of a large orchard of a hundred acres, at the rate of about one acre an hour, with two men and a boy. An interesting account of his method was given in the *Country Gentleman* of the 25th of January last; and as he has also proved the insect to be double-brooded in that latitude; and in order to make a suggestion or two, I copy the following passages from the article:

Two men with poles usually knock off the wormy specimens about as fast as one boy gathers them into a basket. Where they are very numerous, more boys may be needed. As the fruit all hangs downward on the stems, the affected points may be easily seen from the ground, *by the exudations from the "blossom,"* and the men with poles know where to strike. The wormy fruit may be thrown into a large stream or pond and the larvæ thus destroyed, but if the apples float ashore, they will crawl out and escape. A kettle of hot water may therefore be better.

Mr. Chapin informs us that he has tried a series of experiments to determine the season when the insects commit their depredations. The earliest winged moths which he has found appeared on the 4th of June. These came from the cocoons in various hiding places and crevices, where they had passed the winter. About the 15th of July he first detected the presence of the worm in the young fruit *by the exudations already alluded to.* They continue appearing for some weeks. Hence the best season for the *first attack is about the middle of July.* By caging the insects, and watching their transformations, he finds that a second brood comes out early in August. He consequently attaches great importance to making the first attack in July a very thorough one. By doing so, but few insects escape for the second attack on the fruit, and the number of late summer specimens is much diminished, so that instead of having most of his apples spoiled by this second brood, as would otherwise be the case, very few are injured. He finds that the moth will not travel far in search of a place to deposit her eggs, if there happens to be plenty of fruit near at hand for this purpose; but in the absence of loaded trees, she will fly to an indefinite distance. * * * He does not, therefore, fear the results of neglect on the part of his neighbors, so long as they raise apples enough to keep their own moths at home, although it would be better for all to make common cause for their destruction.

I have italicised those passages that I more particularly wish to call attention to. The exudations from the blossom end, twice mentioned, are not indications of the presence of the worm, but, on the contrary, are sure indications of its absence in such apples; for they are caused by the exit of the worm. The middle of July is, therefore, by Mr. Chapin's own showing, a little too late to commence operations most successfully, and I have no doubt he will find it more profitable to commence a fortnight earlier, or about the first of July.

In the latitude of St. Louis, operations should commence by the middle or end of May; and those who use the rubber-tipped pole or mallet for the

Curculio, will find it just the thing needed; while those who have hogs to feed will find it pay to boil the fruit and feed it.

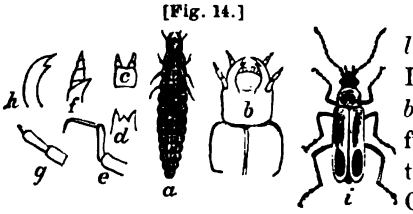
FIRES, LIGHTS, BOTTLES OF LIQUID AS REMEDIES.—I have elsewhere given it as my decided opinion that neither fires, lights or bottles of sweetened water, vinegar or of any other liquid, can be used with any degree of success in fighting the Codling moth, and I have good reasons for so doing. During one whole summer, three years ago, I had a patent moth catcher, constantly in a garden surrounded by several old apple trees badly infested with this insect, and I never caught a single specimen of *Carpocapsa pomonella*. The trap was made of bright tin, with an inverted cone so placed in a basin that I could attach a light, and fill the basin with sweetened fluid. Again, during the summer of 1870, I was in the habit of working till late at night in an office surrounded by apple orchards known to be badly infested. I worked by the aid of two large kerosene lamps, each having a strong reflector, and the light in the room was so bright as to form a constant subject of conversation among the neighbors. Insects of one kind and another would fly into the room by hundreds, and on certain warm, moist evenings would beat against the windows with such rapidity as to remind one of the pattering of rain. Yet during that whole summer I caught but one or two Codling moths in that room, and there was more reason to believe that they had bred in the house than that they were attracted from without. At the same time I had hung up in an orchard close by, many wide-mouthed bottles, half-filled with various liquids, such as diluted syrup, sugar water, and vinegar more or less diluted. Every two or three days these bottles would contain great numbers of insects, which were critically examined. Many of them would be small moths of one kind and another; some of them larger moths known to be injurious, and many other insects—such as beetles, true bugs, wasps and two-winged flies—that were beneficial. Indeed, there were almost as many beneficial as injurious species, and as I shall presently show, the only two species yet known to prey on *Carpocapsa pomonella*, were among the more numerous victims of these hanging bottles. From my notes I find that but three Codling moths were caught in these bottles during the summer. Indeed, so small is the proportion of Codling moths which I have caught by the above mentioned process, that the chances of their accidentally flying into such situations are about as great as of their being attracted. I might add further experience on this head, but it is unnecessary. Upon showing specimens of the Codling moth to many dozens of eminent and intelligent fruit-growers, who have had to do with apple orchards, and consequently with apple worms, most of their lives, I have seldom found one who did not candidly confess that he had never before identified the insect; and under these circumstances it is not surprising that other similar moths should have been mistaken for the genuine article. The moth is, therefore, occasionally caught in such traps, and in the face of other intelligent testimony the fact cannot be denied, though the experience on this head of non-entomologists is conflicting. But whether we consider that the few so caught are really attracted, or are

captured accidentally, I believe that the methods indicated have no practical value. They are blind ways of shirking the more sure and efficient remedies.

I have been thus explicit as to these would-be remedies because my statement "that the Codling moth was not attracted (to any extent) by light," has been recently quoted by Mr. J. W. Robson as an evidence "that scientific men don't know everything." It would be strange indeed if they did, and I have always labored under the impression, somehow or other, that they were the last to claim any such universal knowledge, and that it was the charlatan alone who was blessed with the knowledge of everything. In the latest work on apple culture that has been given to the public, namely, "The Apple Culturist, with illustrations, by S. E. Todd," we naturally look for all that is new and important about this insect, which cuts such a figure in apple culture. Alas! what do we find? The descriptive part is a perfect plagiarism, almost word for word, from an article in the "American Entomologist," (Vol. I, pp. 112-114,) all palmed off as original; while under the head of remedies, he concludes his advice as follows: "By keeping the bottles containing sweetened water and the pan half filled with thin molasses, with a lighted lamp near it in the orchard every night, in good order, almost every insect will be trapped in a few days," and this excellent (!) advice is accompanied by an illustration of a shallow pan with a kerosene lamp on one edge of it, and "flies" as thick as a swarm of bees around it.

NATURAL ENEMIES.—The natural enemies of the Codling moth among birds are principally the Creepers (*Certhiadæ*), especially the Black-capped Tit-mouse. The Downy woodpecker guts great numbers of the cocoons, while the Blue bird and Crow Black-bird also feed upon it, according to Mr. Robson. Among insects two Ichneumons—*Phygadeuon brevis* and *Pachymerus vulnerator*—have been bred from it in Europe, * but no enemies have heretofore been known to attack it in this country. I have, however, discovered two which destroy the worms while they are leaving the fruit, and which in all probability seek them out while in the fruit. The first of these is the larva of the

[Fig. 14.]



PENNSYLVANIA SOLDIER BEETLE (*Chauliognathus Pennsylvanicus*, DeGeer) and I reproduce its likeness (Fig.14, *a*, larva; *b, c, d, e, f, g, h,* head parts; *i*, beetle) from my first Report, where it was shown to prey on the larva of the common Plum Curculio. This larva passes the winter in a nearly full grown state, feeds ravenously during the spring and early summer months; goes into the ground to transform and makes its appearance as a beetle during August, September and October, when it is met quite abundantly on the flowers of such rich pollen-bearing plants as the Golden-rod. While the larva is such a voracious cannibal, the beetle feeds solely on the honey and pollen of these flowers, and it is eminently fitted for this pur-

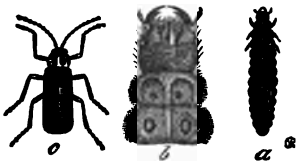
* Taschenberg's "Entomologie fur Gärtner and Gartenfreunde."

pose by the lower jaws (*maxillæ*) being prolonged into slender extensile pilose setæ, which form a sort of tongue analogous to the tongue of moths and butterflies.

The second of these enemies of the Codling moth is

THE TWO-LINED SOLDIER BEETLE, (*Telephorus bilineatus*, Say).—This is a soft-winged beetle of the same general form of, and closely allied to, the preceding—both species belonging to the Family *Telephoridæ*. The Two-lined Soldier Beetle (Fig. 15 *c*,) has brown-black wing-covers, and a reddish-yellow head and thorax, the latter having two short black longitudinal marks, from which the insect takes its name. The underside is a pale reddish-yellow, with a dusky band on the metathorax; the antennæ, feet, shanks, tips of thighs and a band on the head, between the eyes, being also dusky. This beetle makes its appearance much earlier in the season than the other, being found as early as April. It, also, seems to be principally a vegetable feeder, and is quite common with us crawling over the leaves of a variety of trees, I have repeatedly jarred it down with the Curculio catcher from Plum, Peach and Apricot, and Dr. A. S. Packard, Jr., says that it feeds, in the East, on the newly expanded leaves of the Birch. Mr. C. R. Dodge, of Washington, D. C., informs me that he has found it eating into a Lepidopterous chrysalis, a trait which must be considered exceptional.

[Fig. 15.]



The larva was unknown till last year, when Dr. Packard gave a figure and description of it, * without, however, giving any specific account of its habits. I have bred the beetle from larvæ found feeding on Apple worms and afterwards nourished upon them; and as the larva is quite frequently met with under apple trees, among early wind-falls, we may conclude that it has a partiality for the in-dwellers of this fruit; though it doubtless feeds also upon other soft-bodied animals. It is more usually found on the surface of the ground under the fallen fruit, stones, boards or other substances; but I have found it, as well as the larva of the Pennsylvania species, up in the branches, and on the hanging fruit of apple trees.

Both these larvæ are of a rich velvety-brown color, and that of the Two-lined (Fig. 15, *a* natural size; *b* head and first two joints magnified) differs from the Pennsylvania species in having more conspicuous black spots along the body, and an interrupted white line along the middle of the back. For the scientific reader I give below a technical description of it:

The most important fact for the practical man, in connection with what has been said, is, that both these soft-winged beetles—among Nature's appointed checks to the increase of the Apple worm—were quite frequently found by me among the insects in the bottles suspended among apple trees; thus showing that we may do more harm than good with such bottles.

---

* First Ann. Rep. on the Inj. and Beneficial Insects of Mass., pp. 26-28.

SUMMARY.

The Apple worm or Codling moth is an imported insect. There are two broods each year, and the second passes the winter within the cocoon in the larva state. Use hogs and sheep in the orchard wherever it is feasible to do so. Place no confidence in lights and bottles, but rely on the bandage system. Have the bandages in place a week after the first Wilson's Albany strawberries ripen, and destroy all the cocoons underneath them every two weeks till the apples are harvested. Be sure and destroy, as soon as the ground thaws out in the spring, all the cocoons found around storehouses. Urge your neighbors to combine with you in this work.

TELEPHORUS BILINEATUS, Say.—*Larva* (Fig. 15, *a*)—*Body*, 12-jointed, joint 1 longest, 4 shortest, the rest of about equal length; flattened; tapering slightly at each end; velvety; of a rich deep brown above, pale below; intersections deep and broadening from sides to middle of dorsum; two deep longitudinal lateral furrows, and two, less deep, ventral ones; a medio-dorsal pale line continuous on the thoracic joints but showing only on the sutures of the rest; joints 2 and 3 each with a large sunken, suboval brown spot, each side of dorsum, these spots with a pale centre; in a line with these on all the abdominal joints but last is a more or less distinct, slightly sunken, pale line, and still another parallel with it further out on the side. Between these pale lines, on every joint but the last, is a slightly elevated, dark, bead-like tubercle which might readily be mistaken for spiracles; but these last which are dark and quite small are placed on the anterior edge of the first eight abdominal joints, in the upper lateral furrow, and between the first two thoracic joints—there being nine pair in all; anal joint with a moderate pooleg. *Legs* rather short, pilose, the tarsus terminating in a prominent and sharp claw. *Head* flattened, divided superiorly a little beyond the middle by a transverse suture, the basal portion of an opaque, velvety, sooty-black; the anterior portion polished, forming three well defined lobes, with the anterior edge irregularly broken; eyes prominent, placed laterally immediately before the occipital suture: antennæ inserted in a deep socket, 2-jointed, the 2nd four times as long as first and bearing a small sub-joint at tip: labrum not visible [Packard describes it as "broad and perfectly square in front, with a medium notch dividing the edge into two slight lobes." As Walsh describes that of *Chauliognathus* as being retractile, it is probably retracted in my specimens which are alcoholic]: mandibles falcate, with a strong tooth a little beyond the middle of the inner edge: beneath, the anterior edge is deeply and semi-circularly cut out: mentum extending between maxillæ for two-thirds their length: maxillæ large, projecting beyond labium, especially on the inside where they seem to be produced into a slight point; maxillary palpi 3-jtd., the second twice as long as the first, the third rudimentary: labium small, formed of a basal quadrate piece and two palpigerous pieces that are soldered together; labial palpi 2-jtd., the second rudimental.

Described from two alcoholic specimens.

Dr. Packard describes the labial palpi as 3-jointed, doubtless considering the palpigerous piece as a basal joint. He makes no mention of the stigmata, and as Walsh describes the closely allied larva of *Chauliognathus* with 11 pair, which is certainly anomalous; and as Chapuis and Candeze give to Telephorid larvæ but 9 pair, I have very critically examined my specimens, and find the stigmata as described above.

THE PERIODICAL CICADA.

It will be well from time to time to note the appearance of this interesting insect, in different parts of the country, so as to see how far its chronological history, as given in my first Report, is correct. The time for the appearance of six of the broods has passed away, and I will reproduce what was said of them in 1868, and append such facts, confirmatory or otherwise, as have come to my knowledge since.

BROOD I.—*Septemdecim*—1852, 1869.

In the year 1869, and at intervals of seventeen years thereafter, they will, in all probability, appear in the valley of the Connecticut river. According to Dr. Asa Fitch (N. Y. Rep. 1, p. 40), they appeared there in 1818 and 1835, and according to Dr. Smith they occurred in Franklin, Bristol, and Hampshire counties, Massachusetts, in 1767, '84, 1801, '18, '35 and '52.

The genuineness of this Brood was fully established, as its appearance in Connecticut in 1869 was recorded by several different journals.

BROOD II.—*Tredecim*—1856, 1869.

In the year 1869, being the same as the preceding, they will, in all probability, appear in Georgia, in Habersham, Rabun? Muscogee, Jasper, Greene, Washington and adjacent counties, having appeared there in 1843 and 1856, according to Dr. Smith.

True to time, this Brood appeared in great numbers in the northwestern part of Georgia, as I am informed by Mr. A. R. McCutchen, of Lafayette, Walker county, in that State. There is a great deal of evidence, however, which goes to show that it is the 17-year Brood XXII which occurs in the northeastern counties, and Mr. Geo. P. Kollock, of Clarksville, Habersham county, writes that the "locusts" were not there in 1869, but that they swarmed in 1868 and 1851. Habersham county must therefore be stricken from the above Brood II, and perhaps Rabun also; while Walker and adjacent northwest counties should be added.

BROOD III.—*Septemdecim*—1853, 1870.

In the year 1870, and at intervals of seventeen years thereafter, they will, in all probability, appear in what is known as the "Kreutz Creek Valley," in York county, Pa., and possibly in Vinton county, Ohio, and Jo. Daviess county, Ill. Mr. S. S. Rathvon, of Lancaster, Pa., speaking of this Brood says: "Lancaster county is bounded on the southwest by the Susquehanna river, dividing it from the county of York, along the northeastern margin of which there is a mountain range sloping down to the river. Along that slope Cicadas were abundant the present season (1868—Brood XXII). But on the southwest side of the range, in what is known as the Kreutz Creek Valley, there were none. They appeared last in this Valley in 1853, and previous to that year at intervals of seventeen years from time immemorial." Dr. Smith records their appearance in 1853, both in Vinton county, Ohio, and Jo. Daviess county, Illinois.

From all that I can learn, this Brood is invalid and has no existence. Mr. Rathvon failed to record its appearance in 1870 in the Kreutz Creek Valley, and the Rev. Dr. J. G. Morris of Baltimore, Md., writes positively that it did not appear. He says: "Our Lancaster friend, Rathvon, was a little mistaken in presuming that this would be the year of the appearance of the Cicada in Kreutz Creek Valley, York county, Pa. I have made diligent inquiry of persons familiar with that district, and they report no locusts. Now, it may be that he gives that title to a district different from that which I know by that name (for I was born in that vicinity), but the Kreutz Creek Valley, 7 or 8 miles east of York, and bordering on the Susquehanna, was not visited this year by this singular Cicada."

I likewise failed to hear of the "locusts," either in Vinton county, Ohio, or in Jo. Daviess county, Ill., and as all three of the localities are restricted and widely separated, and as those in Illinois and Pennsylvania are within the range of Brood V, which occurs one year later, the insects recorded to have appeared in the localities named in 1853, were most likely precursors only of the more extensive Brood V.

BROOD IV.—*Tredecim*—1857, 1870.

In the year 1870, being the same as the preceding, they will, in all probability, appear in Jackson, Gadsden and Washington counties, Florida, having appeared there, according to Dr. Smith, in 1844 and '57.

The appearance has been fully confirmed, and as the following communication will show, the Brood extends even into Alabama, Mississippi and Tennessee.

DEAR SIR—The 13-year Brood of the Periodical Cicada mentioned in your first Missouri Report (your Brood IV) appeared, according to prediction, in northwestern Florida this year, extending northward over Alabama and a good portion of eastern Mississippi, and into Tennessee as high as this point. I think I wrote you when they were here. They were not in great numbers at any point. I was at Mobile at the time of their appearrance there, and found them singing quite merrily in the woods below the city. J. PARISH STELLE.

Savannah, Tenn., Sept. 2, 1870.

BROOD V.—*Septemdecim*—1854, 1871.

In the year 1871, and at intervals of seventeen years thereafter, they will, in all probability, appear around the head of Lake Michigan, extending as far east as the middle of the State of Michigan, and west an unknown distance into Iowa. Also in Walworth county and other portions of Southern Wisconsin, and southward into Illinois. This brood is equal to Dr. Fitch's Sixth. It extends all over Northern Illinois, and as far south as Edgar county, and its appearance in 1837 and 1854 is well and thoroughly recorded. In Champaign county, Ill., it overlaps Brood XVIII, or the Southern Illinois *tredecim* brood, while it also interlocks with Brood XIII (*septemdecim*) in the same county.

They will also appear in the same years in the southeast by eastern part of Lancaster county, Pa., in what is called the "Pequea Valley," having appeared there in vast numbers in 1854.

The earliest known record we have of the appearance of periodical Cicadas, is in Morton's "Memorial," in which it is stated that they appeared at Plymouth, Plymouth county, Mass., in the year 1633. Now, according to that date, one might be led to suppose that this recorded brood of Morton's belonged to this Brood V, as exactly fourteen periods of seventeen years will have elapsed between 1633 and 1871; but, strange to say, we have no other records of this brood than that in the "Memorial," whereas there are abundant records of their appearing one year later in the same locality, ever since 1787. There is, therefore, good reason to believe that the visit recorded by Morton was a premature one, and that it was properly due in 1634. I have therefore placed it in Brood VIII, and have little doubt but that if records could be found, these would prove the Cicadas to have appeared in 1631, 1668, 1685, 1702, 1719, 1736, 1753, and 1770, as they did in 1787, 1804, 1821, 1838, and 1855.

Throughout the country mentioned in the first paragraph, the woods, orchards, cornfields and even meadows were vocal with the shrill song of these seventeen-year visitors. I was absent during the time of their appearance, but through the kindness of Dr. LeBaron, Mr. Suel Foster, of Muscatine, Iowa, Mr. H. H. McAfee of the Wisconsin University, and several other correspondents, I am enabled to fix more precisely the northern, southern and western boundaries of this Brood. Thus, in Wisconsin we may draw a line from Milwaukee on the east, gradually southward to the middle of the southern line of Waukesha county, then making a sudden dip to the centre of Walworth county, and rising again a little above the southern line of Jefferson county; then falling a little below Dane; then rising from the S. W. corner of Dane to the N. W. corner of Iowa county, and from thence along the Wisconsin river to its mouth. There seems also to be a detached branch commencing about the middle of the northern part of Iowa county and running across the Wisconsin river into Sauk county. In Iowa the boundary line extends from the mouth of the Wisconsin river,

S. W. to Vinton, in Benton county; thence S. E., skirting the Iowa river, to the Mississippi at a point in the northern part of Louisa county—thus embracing about a dozen counties, or 1-12th part of the State. In Illinois the boundary line, in a general way, may be drawn from the N. W. portion of Mercer county, S. E. to the Illinois river at Peoria, W. along the Toledo, Wabash and Western railroad. There seem to be detachments extending further south, especially in the eastern portion of the State, and they occurred as far south as Shelby county. In Indiana the line is not well defined, but includes the extreme N. W. counties, extending as far south as the Kankakee river. In Michigan it does not extend north as far as St. Joseph on the Lake.

As this insect can only appear in districts which were timbered or planted to orchard 17 years ago, it follows that in such an extensive prairie country as that within the limits indicated, the Brood must be very much detached and scattered.

They did not appear in the Pequea Valley in Lancaster county, Pa.: at least I have been unable to get any authentic record of the fact.

From all I can learn no Cicadas appeared at Plymouth, Mass., a fact which corroborates my view expressed in 1868, that the visit recorded by Morton in 1633 was a premature one and that it was due in 1634:

BROOD VI.—*Tredecim*—1858, 1871.

In the year 1871, being the same year as the preceding, and at intervals of thirteen years thereafter, they will, in all probability, appear in the extreme southwestern corner of Mississippi and in the adjoining part of Louisiana. Dr. D. L. Phares, of Newtonia (near Woodville,) Miss., says that in 1858, they extended over most of Wilkinson and part of Amite counties, Mississippi, and East and West Feliciana, La. He has himself witnessed the appearance of this Brood during the years 1832, 1845 and 1858, while it is distinctly remembered by aged people in his neighborhood as having also appeared there in the years 1806 and 1819. Dr. Smith gives their range from the Mississippi river, east to a ridge forty-five miles from the river that divides the State north and south, and north and south to the boundaries of the State; recording them as occurring in 1806, '19, '32, '45 and '58.

This Brood also appeared last summer, and a few precursors were noticed in 1869, but none in 1870. I quote the following account of it from a letter from Dr. Phares: "A few males began to appear about the 20th of April. Not many of any kind came out till the 7th and 8th of May. On those two days from 5 1-2 till 8 p. m., or about dark, they came forth from the earth in vast numbers; and in large numbers from that time for ten days more—the last I noticed, issuing on the 18th of May and being mostly of the smaller and sometimes darker colored individuals. Perhaps three-fourths of those coming up on the 7th and 8th of May were females. They are now (May 22nd) in full song, and I notice, with others, that when my large bell (412 pounds) is rung, they sing with redoubled fury."

Dr. Phares also sent me a large number of specimens, and measurements to show that there is a variation of at least half an inch in the expanse of the wings, and that the small dark form which has been named *Cassinii* is connected with the larger normal form by infinite grades. He is more convinced than ever that the small form cannot be a distinct species, and that there should be no *C. Cassinii* recognized; in which opinion I fully concur.

The experience of the past year furnishes nothing new beyond what I

gave in 1868. As usual, a number of cases of stinging were reported, and my conclusion that such stinging is caused by the beak, is strengthened by the experience of Dr. LeBaron. It was quite apparent that the eggs seldom, if ever, hatched from twigs which fell off the tree and became dried.

The foregoing record clearly proves the genuineness of five out of my first six Broods, the third being the only one, so far, which must be rejected.

THE GRAPE-VINE COLASPIS, AGAIN—*Colaspis flavida*, Say.

[Fig. 16.]

I have had an opportunity of examining a number of additional specimens of the larva of this insect, which has continued its injuries to strawberry roots in some parts of St. Louis county and of South Illinois; and though I have nothing to add to its economy as set forth in my last Report, I find it necessary to revise the description of the larva for the benefit of the entomological student. As stated at the time, my former description was drawn up from two rather poor alcoholic specimens, and after more carefully examining a great number of good, living larvæ, I find that description not sufficiently accurate. Upon more careful study, this larva plainly shows its Family characteristics, and the ventral appendages are rarely as prominent as previously indicated (Rep. 3, Fig. 38), being in reality but largely developed tubercles which the larva has the power of extending or retracting. The following description should therefore replace the other:

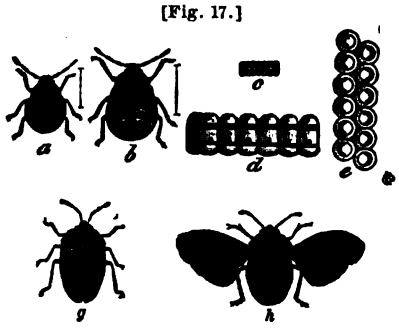
COLASPIS FLAVIDA, Say—*Larva*—Color yellowish. Body slightly arched. Anal joints smaller than the others. First joint horny above and of the same color as head. Dorsum with about three wrinkles to each joint and sparsely clothed with yellowish hairs, each springing from a minute rufous polished point. Stigmata, 9 on each side, rufous, the first between joints 1 and 2, the others placed on a lateral series of swellings, commencing with joint 4. Joints 4—11 inclusive, each with 8 substigmatal concolorous shiny plates (Fig. 16, *a*), the upper row lateral and divided from the second by a longitudinal depression: the second row forming tubercles which are retracted or projected at will. *Head* (Fig. 16, *b*, under side; *c*, upper side), honey-yellow, rounded, slightly flattened in front; epistoma and labrum of same color: mandibles darker, triangular, with the inner edge slightly excavated near the tip; antennæ apparently two-jointed, short and with the terminal joint often bifid; maxillæ well developed, the inner lobe furnished with strong hairs; maxillary palpi prominent, 4-jointed; labium sub-obsolete; labial palpi forming simply two small piliferous tubercles. *Legs* scaly, pale, setous, and terminating in a brown claw. Anal joint not horny below. Length, 0.25—0.30 inch.

Described from numerous specimens.

THE HARLEQUIN CABBAGE-BUG.—*Strachia* [*Murgantia*] *histrionica*, Hahn.

(Heteroptera, Scutelleridæ.)

[Fig. 17.]



Prior to the year 1870 the insect which forms the subject of this sketch was not known to occur in Missouri. It has of late years been gradually traveling towards us from the more southern States, and has already made its presence a little too manifest in some of our southern counties, and in Kansas I have met with it at a latitude higher than St. Louis. It extends to Guatemala, and is found in Mexico; and it varies very much, as most species are found to do when their geographical distribution is studied. As it extends southward we find the dark colors predominating, and becoming more intensified and brilliant, and Stäl has described a species (*Murgantia munda*) from Mexico, which is doubtless but a geographical race, since all the intermediate grades occur between it and the more northern form of *histrionica*. My friend, Mr. P. R. Uhler, has made some interesting experiments on the species, which have clearly proven that when reared in the dark the pale red parts predominate; while if reared in the bright day-light, the dark blue colors predominate. I gave a short account of it in the *American Entomologist* (Vol. II., pp. 79, 80), and cannot do better than repeat that account here with such modifications and additions as are necessary to render it more complete.

Cabbage-growers in the North are apt to think that the plant which they cultivate is about as badly infested by insects as it is possible for any crop to be, without being utterly exterminated. No sooner are the young cabbages above ground in the seed-bed, than they are often attacked by several species of Flea-beetles. By these jumping little pests the seed-leaves are frequently riddled so full of holes that the life of the plant is destroyed; and they do not confine themselves to the seed-leaves, but prey to a considerable extent also upon the young rough leaves. After the plants are set out, the larvæ of these insects are found upon the roots, in the form of tiny elongate six-legged worms. Through the operations of these subterranean foes, the young cabbages, especially in hot dry weather, often wither away and die; and even if they escape this infliction, there is a whole host of cutworms ready to destroy them with a few snaps of their powerful jaws; and the common White Grub, as we know by experience, will often do the very same thing. Suppose the unfortunate vegetable escapes all these dangers of the earlier period of its existence. At a more advanced stage in its life, the stem is burrowed into by the maggot of the Cabbage-fly (*Anthomyia brassicæ*)—the sap is pumped out of the leaves in streams by myriads of minute

Plant-lice covered with a whitish dust (*Aphis brassicæ*)—and the leaves themselves are riddled full of holes by the tiny larva of the Cabbage Tinea (*Plutella cruciferarum*), or devoured bodily by large fleshy larvæ of the different owlet moths or of the white butterflies that were treated of in my second Report.

Severe as are these inflictions upon the northern cabbage-grower, there is an insect found in the Southern States that appears to be, if possible, still worse. This is the Harlequin Cabbage-bug, so called from the gay theatrical harlequin-like manner in which the black and orange-yellow colors are arranged upon its body. The first account of the operations of this very pretty but unfortunately very mischievous bug appeared in the year 1866, from the able pen of Dr. Gideon Lincecum, of Washington county, Texas, and was printed in the *Practical Entomologist* (Vol. I. p. 110). His remarks are to the following effect:

The year before last they got into my garden, and utterly destroyed my cabbage, radishes, mustard, seed turnips, and every other cruciform plant. Last year I did not set any of that Order of plants in my garden. But the present year, thinking the bugs had probably left the premises, I planted my garden with radishes, mustard, and a variety of cabbages. By the first of April the mustard and radishes were large enough for use, and I discovered that the insect had commenced on them. I began picking them off by hand and tramping them under foot. By that means I have preserved my 434 cabbages, but I have visited every one of them daily now for four months, finding on them from thirty-five to sixty full-grown insects every day, some coupled and some in the act of depositing their eggs. Although many have been hatched in my garden the present season, I have suffered none to come to maturity; and the daily supplies of grown insects that I have been blessed with, are immigrants from some other garden.

The perfect insect lives through the winter, and is ready to deposit its eggs as early as the 15th of March, or sooner, if it finds any cruciform plant large enough. They set their eggs on end in two rows, cemented together, mostly on the underside of the leaf, and generally from eleven to twelve in number. In about six days in April—four days in July—there hatches out from these eggs a brood of larvæ resembling the perfect insect, except in having no wings. This brood immediately begins the work of destruction by piercing and sucking the life-sap from the leaves; and in twelve days they have matured. They are timid, and will run off and hide behind the first leaf-stem, or any part of the plant that will answer the purpose. The leaf that they puncture immediately wilts, like the effects of poison, and soon withers. Half a dozen grown insects will kill a cabbage in a day. They continue through the summer, and sufficient perfect insects survive the winter to insure a full crop of them for the coming season.

This tribe of insects do not seem liable to the attacks of any of the cannibal races, either in the egg state or at any other stage. Our birds pay no attention to them, neither will the domestic fowls touch them. I have, as yet, found no way to get clear of them, but to pick them off by hand.

To give some idea of their numbers in Texas, Mr. Benj. R. Townsend, of Austin, in that State, wrote me, under date of February 28, 1870, that he had, within a few days, gathered 47,000 of the bugs.

In September, 1870, I received from William R. Howard a single specimen of this bug, which was found depositing her eggs near Forsyth, in

Taney county, and this was the first announcement of its appearance in Missouri. From the same source I learn that last July myriads of the insects appeared on the cabbages of the Hon. Jesse Jennings in that county, and that the plants were finally ruined. They have likewise been found on the grounds of Mr. B. F. Lee, in Marshfield, Webster county. Through the kindness of Mr. Howard and of Mr. Townsend I have received a number of specimens and have been enabled to present the following facts in its economy:

The eggs (Fig. 17, *c*), are 0.05 inch long and 0.03 inch wide, and, as stated by Dr. Lincecum, are usually deposited in two rows of about half a dozen each, and they are beautiful objects. When first deposited they are of a light green color, but they soon become white, with black bands. They may be likened to little barrels, for though the sides are straight, the edges are rounded off and the black bands, recalling the hoops, and a black spot near the middle, recalling the bung-hole, add to the resemblance. There are two black bands, the upper thicker than the lower, and the black spot is just above the lower band (Fig. 17, *d*). The upper edge is slightly crenated and drawn a little over a convex lid which is marked with a crescent-shaped black spot on the outside (Fig. 17, *e*). The inner sides by which the eggs are fastened to each other are almost entirely black. In depositing, the ovipositor is moved from row to row in a zig-zag line. To afford a passage to the young larva, one of the heads of the barrel—the one, of course, that is not glued to the surface of the leaf—is detached by the beak of the little embryo as neatly and as smoothly as if a skillful cooper had been at work on it with his hammer and driver. And yet, instead of employing years in acquiring the necessary skill, the mechanic that performs this delicate operation with unerring precision, is actually not as yet born into this sublunary world!

The larva (Fig. 17, *a*) is of a uniform pale greenish color, marked with polished black as in the figure. The pupa (Fig. 17, *b*) differs from it only in some of the pale marks inclining to orange, and in the possession of conspicuous wing-pads; and they both differ from the mature bug, not only in the non-possession of wings, but in their antennæ being but 4 instead of 5-jointed, as they afterwards become.

There are several broods of this bug during the course of the year, and the eggs will sometimes hatch the third or fourth day after deposition; while Mr. Howard informs me that the bugs will go through all their moultings and be ready for reproduction within a fortnight.

The mature bug (Fig. 17, *g* & *h*) is prettily marked with polished orange and blue-black, the relative proportion of the two colors being very variable and the orange inclining either to yellow or red. Besides cruciferous plants, Mr. Howard has found it feeding on a variety of the Pea.

It is said that no criminal among the human race is so vile and depraved, that not one single redeeming feature can be discovered in his character. It is just so with this insect. Unlike the great majority of the extensive group to which it belongs, it has no unsavory bedbuggy smell,

but on the contrary exhales a faint odor which is rather pleasant than otherwise. I have already referred to the beauty of its coloring. As offsets, therefore, to its greediness and its thievery, we have, first the fact of its being agreeable to the nose, and secondly the fact of its being agreeable to the eye. Are there not certain demons in the garb of angels, occasionally to be met with among the human species, in favor of whom no stronger arguments than the above can possibly be urged?

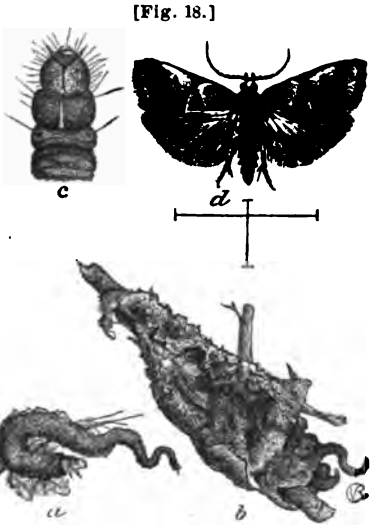
No remedy other than hand picking, is yet known; and I have had no opportunity of trying the effects of the various applications such as salt, ashes, soot, etc.

It is an interesting fact that in Europe, the cabbage grower is pestered with a bug (*Strachia ornata, Linn*) which bears a striking general resemblance to our insect in color and ornamentation, and which, as I was assured by M. E. Mulsant, of Lyons, France, has the light parts red in spring and yellow in autumn.

THE RASCAL LEAF-CRUMPLER—*Phycita* * [*Acrobasis*] *nebulo*, Walsh.

(Lepidoptera, Phycidæ.)

[Fig. 18.]



Such is the name given to an insect which is quite common in the Western States, and which also occurs in Ontario, but does not seem to be known in the Eastern or extreme Southern States. It was first described by Mr. Walsh, in the *Prairie Farmer* for May, 1860, p. 308.

It is one of those insects which is hardly noticed while carrying on its most destructive work; for it is most voracious during the leafy months of May and June, and is then more or less hidden by the foliage of the tree which it so effectually helps to denude. But the nakedness of winter, though it does not reveal the surreptitious worm, lays bare and renders conspicuous its little house, and

* For reasons repeatedly given, I retain the technical name first given to this moth by Mr. Walsh. It was certainly properly referred to that genus as characterized by Westwood (Synopsis, p. 113). But genera have become so multiplied of late years, that many of the older and earlier erected are fast vanishing from our classification. None but the specialist can undertake to keep up with the endless new generic characters that are being made, too often, to my mind, on the most trivial grounds; and none but the specialists are particularly interested in these changes. For practical purposes, therefore, unless there are good and sufficient reasons for making a change, it is best to adhere as much as possible to those names by which notorious insects have become generally known. This course is always safe, if the more modern genus to which the insect should be referred is in some way hinted at, for the entomological student. *Phycita nebulo*, Walsh is *Myelois indiginella*, Zeller, as I am informed by the latter author who has had occasion to examine specimens which I forwarded to him. In reality it belongs to the genus *Acrobasis* as characterized by the same author in the *Isis* of 1848, p. 606.

these houses—these larval cases—whether closely attached in clusters to the twigs as at Figure 18, *b*, or hidden in a few seared and silk-sewed leaves as at Figure 19, are unerring tokens of past injury to the tree, and symbols of increased injury in the future, unless removed. The bunches of leaves anchored to the tree by strong silken cables and breasting defiantly every winter's wind, are, indeed, significant insignia upon which is written in characters, if not in words—"result of careless culture and unpardonable neglect."

[Fig. 19.]

This insect sometimes becomes so prodigiously multiplied in young orchards or in the nursery, as to seriously affect the health of the trees; for it does not confine itself to the leaves, but often in early spring commences on the swelling buds, attacks the young fruit, or gnaws the tender bark. Though I have not met with this Leaf-crumpler in Southern Illinois, it nevertheless occurs throughout our own State, and is quite injurious in the southwestern counties. There is but one brood a year, and the larva, about one-third grown, invariably passes the winter protected in its case. At this season of the year it is always of a deep reddish-brown color. As the leaves expand in spring it rouses from its winter lethargy, and after "heaving anchor"—to use a nautical expression—by severing the silken connections of its case, travels in search of food, and, having found it, secures its case again and breaks its long fast. Toward the end of May it acquires its growth, when the earlier brown color frequently takes on a more or less decided deep green hue. It is a smooth worm with the head and thoracic joints as represented at *c*. The case at this time usually presents the appearance of Figure 18, *a*, being crooked and twisted like a little horn, gradually enlarging, cornucopia-fashion, from tip to mouth, and reminding one strongly of a piece of bird dung. It is formed of the worm's excrement and other debris, interwoven with silk, and is completely lined on the inside with a carpet of the last named material. The worm leaves it for feeding purposes mostly during the night. The chrysalis is formed inside this case, and the moths commence to make their appearance during the forepart of June, and later as we go further north.

The moth (Fig. 18, *d* and Fig. 20, *c*) has the front wings of a pale ash-gray color, variegated with cinnamon-brown and dark brown; while the hind wings are of a uniform dusky-gray. The male is distinguished from the female by a little horn-like tuft on the basal joint of the antennæ, which is a characteristic of the genus. The worms hatching from the eggs deposited by these moths are about one-third grown when winter sets in, and they pass this season as already described, and thus the insect continues from year to year the cycle of its life.

I have bred this insect from Apple, Cherry, wild and cultivated; Plum, wild and cultivated; Quince, and Crab-apple, and have noticed the cases on

Peach. Near St. Louis it has been, if anything, more injurious to quince than to apple trees. Yet it does not seem to be able to live on the Pear.

REMEDIES.—The Rascal Leaf-crumpler is one of those insects which, from their peculiar habits, are easily subdued. The orchardist has but to bear in mind that it is single-brooded, and that it passes the winter in its case, and he will understand that by collecting and destroying these cases in the dead of the year when the tree is bare, he effectually puts a stop to its increase. If this fact were more generally recognized, we should see fewer of these insects in our orchards and nurseries. Whether collected in the winter or pulled off the trees during the spring and summer, these cases should always be thrown into some small vessel, and deposited in the centre of a meadow, or field, away from any fruit trees. Here the worms will wander about a few yards and soon die from exhaustion and want of food; while such parasites, hereafter mentioned, as are well developed or in the pupa state, will mature and eventually fly off. In this manner, as did Spartacus of old, we swell the ranks of our friends while defeating our foes.

When so simple a remedy is at hand it is hardly necessary to seek for others. Applications of air-slacked lime to the tree when the foliage is moist, have been urged as a remedy; but it would seem that the worm is too snug in its retreat to be much affected by any such dustings, and there is scarcely any occasion to resort to any other than the simple and effectual remedy suggested. Because empty cases are found after such applications, men must not run away with the idea that the inmate has been scared away; for there is always a certain proportion of old cases which are empty. These stick to the tree long after the moths have escaped from them, and furnish a snug retreat for some other insects. The female Canker-worm particularly is fond of depositing her eggs within such old cases, as I have frequently found them crowded with such eggs.

NATURAL ENEMIES.—In Mr. Walsh's time but one real parasite was known to infest the Leaf-crumpler, and that was a little two-winged fly, which might easily be confounded with the common House-fly. It has not yet been described, and as my friend Dr. LeBaron bred it on several occasions the past year and has undertaken to describe it, I present below his description, as kindly furnished me for use. This *Tachina* larva becomes a pupa within the case of its victim, and Mr. D. B. Wier tells me that it was so abundant at Lacon, that the Leaf-crumpler was not one-tenth as numerous in 1871 as it had been in 1870.

TACHINA [EXORISTA] PHYCITÆ, LeBaron—*Imago*.—Length, 0.20 inch. Antennæ black, third joint twice as long as the second; face silvery, without bristles at the sides; sides of the front silvery at the lower part, pale golden above; the middle black vitta occupying a little more than half of the width of the inter-ocular space; frontal bristles continued down the face to opposite the end of the second joint of antennæ; palpi blackish-brown; eyes hairy. Thorax black, with the ordinary cinereous stripes scarcely perceptible. Abdomen black, varied with cinereous at the base of the segments; a large fulvous spot on the side of the abdomen occupying nearly the whole of the side of the second segment, half or more of the third, and sometimes a small spot on the first; bristles on the middle as well as at the hind-margin of the second and third segments. Venation of the wings of the usual type; first posterior cell almost closed, before the end of wing; fourth long vein slightly curved after the angle; fifth long vein prolonged to the margin; third cross vein moderately sinuous. Tarsal claws and pulvilli unusually long.

Female? A single specimen, a very little larger than the others, was obtained from the same lot of leaf-crumplers, which possibly may be the ♀ of the same species. It differs as follows: Front broader; antennæ dark brown; the cinereous markings of the body more distinct; the tip of abdomen fulvous, but without the fulvous spot at the sides; and with the tarsal claws of ordinary length.

This species appears to belong to the subgenus *Exorista* of Meigen, closely allied to *Tachina* proper, and differing from it chiefly in having the eyes hairy, and in the presence of bristles on the middle, as well as at the hind margin of the second and third abdominal segments, whereas *Tachina* has only the latter.

Mr. Wier has given me specimens, said to be bred from it, of a small Ichneumon-fly which proves to be *Limneria* [*Banchus*] *fugitiva,* Say.* It is a small black species with the legs pale yellow, except the hind tibiæ which are white with black base and tip, and the hind tarsi which are black with the base of the first joint white. In this genus the terminal part of the abdomen is compressed laterally, and arched, and the ♀ ovipositor is so short that it does not extend beyond the tip of abdomen, so that the sexes do not differ very strikingly. This particular species infests other insects,† and I have obtained it from larvæ, at Chicago, Ill., as well as at St. Louis.

PHYCITA [ACROBASIS] NEBULO, Walsh—*Imago.*—I reproduce here the description of the moth in Mr. Walsh's original words: "Expansion of wings 7-10. Length of body 3-10. General color light cinereous, varied with dusky. A row of about seven subsemilunar or linear dark spots on outer margin of fore wing. Then one-fourth of the distance to the body a waving light cinereous band parallel to the exterior margin, marked on each side with dusky black. Nearly at the centre a much abbreviated black band. Beyond the centre on the costal margin a subtriangular dusky black spot, the apex of which connects with the apex of a much larger subobsolete triangular brick red spot which extends to the interior margin, and is bounded on the outside by a wavy light cinereous band, which is again bounded by a wavy dusky black band proceeding from the apex of the costal triangle. Base of wing dusky black, enclosing a small round light cinereous spot. Hind wings and all beneath light cinereous shaded with dusky, the fore wings darker. Tarsi dusky with a narrow light cinereous fascia at the apex of each joint. Hind tibia fasciate with dusky at the apex, sometimes obscurely bifasciate. Intermediate tibia fasciate with dusky at the centre, the fascia generally extending to the base, but becoming lighter. Anterior tibia dusky, with a narrow apical light cinereous fascia. Palpi, both labial and maxillary, dusky."

When compared with other closely allied and resembling species, this little moth may be characterized in the following manner: The ground color of the front wing is decidedly bright and pale; the discal spots are almost always confluent, thus forming an abbreviated transverse bar; the dark markings are well defined and the triangular dark costal spots starting from the inner third of the wing is distinctly relieved, while the "brick-red" (nearer a cinnamon-brown) triangular spot which opposes it is large, so that the space it occupies on the inner margin is nearly as wide (generally within one-third) as that between it and the transverse posterior line. The lower half of the basal space is often of a distinct cinnamon-brown, and an oblique dusky band, which Mr. Walsh has not mentioned, is often quite distinct, running from near the apex to the brown triangle, where it connects with the inner margin. The species recalls, in facies, the European *Myelois suavella.* In a suite of specimens bred from Apple, Quince, Plum and Cherry, there is sufficient variation to prevent a too rigidly drawn description, but the above characters obtain in all of them, and such variation as occurs, runs in the direction of the variety presently to be described.

Larva—Brown or greenish in color. Cylindrical. Tapering gradually from first to last joint. Head and cervical shield darker than the rest of body, slightly shagreened, sparsely covered with long hairs, the shield quite large, convex, and occupying the whole surface between stigmata—there being in front of the latter a sub-cervical dark horny plate. Joints 2 and 3 wrinkled as at Figure 18, *c* the former with two rather conspicuous dark dorsal pilliferous spots. The other joints with a few fine hairs, the stigmata plainly visible, and the anal covering but slightly horny. Legs and prolegs of moderate size and of same color as body.

Described from numerous specimens.

Chrysalis—Mahogony-brown, with no striking character. Abdomen, especially above, with very minute punctures.

---

* Ent. of N. A. II, p. 701.

† Mr. J. A. Lintner, of Albany, N. Y., has given me specimens bred from *Saturnia maia,* Drury; Mr. H. T. Bassett, of Waterbury, Vt., specimens bred from *Dryocampa senatoria* Sm., and I have bred it from *Dryocampa stigma,* Sm., from *Euchætes egle,* Harr, and from *Clisiocampa sylvatica,* Harr.

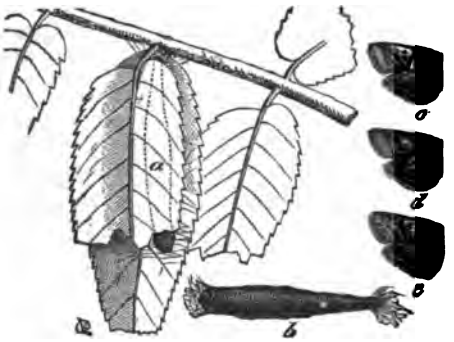
VARIETY NEBULELLA (Fig. 20, *e*).—I have bred a single specimen from wild Crab (*Cratægus*) which differs in some essential features from the normal form, but which nevertheless can only be considered a variety of it, as I observed no larval differences. It differs in the more uniform and subued tone of the front wings, the markings being more suffused and indistinct; but principally in the relative narrowness of the space outside the transverse posterior line the greater consequent width of the middle area, and smallness of the triangular brown spot—the space it occupies on the inner margin being scarcely one-half as wide as that between it and the transverse posterior line. The discal spots are also separated.

Described from one good specimen. An interesting fact connected with this variety is, that precisely the same form occurs in Europe, as I found a single specimen in the cabinet of M. J. Lichtenstein of Montpellier, France, which he had captured in that vicinity, and which he allowed me to bring home for comparison. It seems to be rare, even there, and whether indigenous or imported from this country, is a question yet to be solved.

THE WALNUT CASE-BEARER—*Acrobasis juglandis*, LeBaron.

(Lepidoptera Phycidæ.)

[Fig. 20.]



There are several other worms tolerably common with us which form cases very much like those of the Rascal Leaf-crumpler just described. One of these which is tortuous and crooked, like the preceding, is found attached to the leaf of the Post oak, the worm skeletonizing the leaf for food. Another, which is straight, is found on the Soft maple, the inhabitant drawing a few leaves together and likewise skeletonizing them. The moths which these produce are not yet known; but there is a straight case-bearer found on Hickory and Walnut which produces a moth so much resembling our *nebulo*, that, though the insect cannot be considered a very injurious one, I am led to give a brief account of it for purposes of comparison, and to show how distinct species, with constant larval characteristics, may so graduate into each other in the perfect state as to render knowledge of their larval habits absolutely necessary to distinguish them.

The case of this insect (Fig. 20, *b*) is invariably straight, and the excrementitious grains which cover it on the outside, are very closely and neatly woven together. It is attached by the small posterior end to the main leaf-stalk, and the worm draws down and fastens two of the leaflets to hide it, and then feeds upon them from the point to the base (Fig. 20, *a*). The worm differs in no respect from that of *nebulo*, except in being more commonly dark greenish. There is, in all probability, but one brood a year, and as with *nebulo* the larva passes the winter in a partially grown condition; and as it lives during the summer on a compound leaf, it very wisely abandons this leaf, and anchors its case firmly to the more enduring twig, before winter sets in.

The moth very closely resembles *nebulo*, as may be seen by referring to Figure 20, *d*, which shows its wing characters, the colors being the same. In this cut I have given two subsidiary sketches, the one at *c* showing the typical *nebulo*, the other at *e* representing a crab apple feeding variety of the same; and the general reader will readily perceive (providing the public printer does not give us too muddy an impression) that the intermediate figure (*d*) differs less from the upper (*c*) than from the lower one (*e*). Yet the differences in the habits of the larvæ show that the Walnut Case-bearer is a distinct species.

ACROBASIS JUGLANDIS, LeBaron.—(Fig. 20, *d*)—I have bred this species from Hickory, but as Dr. LeBaron has also bred it abundantly from Walnut, and has signified his intention of describing it in his second annual Report, I adopt his proposed name, and shall content myself with pointing out the manner in which it may generally be distinguished from *nebulo*. Firstly, by the paler basal area of the front wings, which is sometimes almost white, especially near the costa, and by the head and shoulders and sometimes the ♂ antennal horn partaking of this paler color. Secondly, by the darker median space, the dark triangular costal spot not being well relieved posteriorly, but extending so as sometimes to darken the whole space. Thirdly, by the discal spots always being well separated.

Such are its specific characters as taken from 3 hickory-bred and 6 walnut-bred specimens; but of the former there is 1 which when placed alongside of some of the more abnormal specimens of *nebulo*, can scarcely be distinguished from them, and, if chosen without knowledge of its larva, would certainly be placed with them; while of the latter there are two which nearly as closely resemble the variety *nebulella*. In general characters, in the size of the brown triangular spot, and the manner in which the inner margin is divided, *juglandis* is intermediate between *nebulo* and *nebulella*. In one of the hickory-bred specimens, the general color is quite warm, and the basal area carneous rather than white.

NATURAL ENEMIES.—From a lot of parasites bred from this insect by Dr. LeBaron, I find four distinct Ichneumon-flies. Three of them are black with legs variously marked with yellow reddish and black, and they all belong to the genus *Pimpla** which is characterized chiefly by the joints of the abdomen being for the most part broader than long, and the ovipositor of the female, with its sheaths, never extending more than the length of the abdomen beyond its tip. The fourth is a yellow fly belonging to the genus *Perilitus*, and as I am kindly informed by Mr. E. T. Cresson, is a new species. I therefore describe it by the name of

PERILITUS INDAGATOR, N. Sp—Imago—♀, *Head* almost glabrous, transverse, deep honey-yellow, the trophi pale, except the tips of jaws, which are dusky; ocelli touching each other, black; eyes black, very large, occupying nearly the whole side of face, and with a few very short hairs; antennæ with about 24 joints, pale fuscous; reaching, when turned back, to about the middle of abdomen. *Thorax* honey-yellow beneath and very slightly pubescent; very finely punctured and slightly pubescent above; prothorax honey-yellow and prominently convex; mesothorax with lateral and posterior sutures black; metathorax black. *Abdomen* with the pedicel black and slightly punctured; depressed, narrow at base, widening behind, slightly pubescent above; the other joints glabrous, polished, deep honey-yellow, the second joint largest and as long as all the subsequent ones together; ovipositor extending about the length of the abdomen beyond its tip, rufous with the sheaths black. *Legs* pale honey-yellow, the tarsi, especially at tips, slightly dusky, the hind femora and tibiæ a little dusky towards tips, and a narrow rufous ring at base of former. *Wings* hyaline, iridescent; veins brown; stigma honey-yellow, with an opaque brown cloud; two cubital cells, the outer small, sub-quadrate; the radial large; one discoidal, long and narrow. Length, exclusive of ovipositor 0.18 inch.

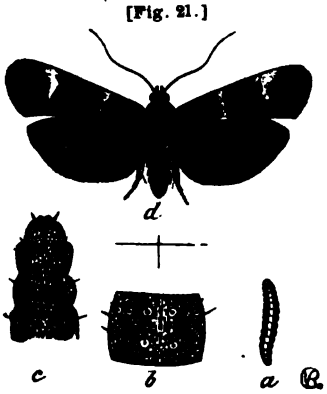
Described from 1 ♀ bred from *Acrobasis juglandis*, LeB.

*These are *Pimpla conquisitor*, Say (Ent of N. A. II, p. 689,) *Pimpla indagatrix*, Walsh, Cress. (Trans. Am. Ent. Soc. III, p. 146,) and *Pimpla annulipes* Br. (Hist. Nat. des Ins. Hym. IV, p. 102.)

THE APPLE-LEAF SKELETONIZER—*Pempelia Hammondi*, N. Sp.

(Lepidoptera, Phycidæ.)

[Fig. 21.]



The leaves of apple trees, and especially of young trees, are preyed upon by such a host of insects that their histories alone would furnish material for a good sized volume. The little worm which forms the subject of this sketch has never been described, and yet it is oftentimes so injurious and its work is so intimately associated with that of one or two other species, with which perhaps it has been confounded, than an account of it becomes doubly necessary. Though having different habits, it is quite closely related to the better known Rascal & Leaf-crumpler.

In the fall of the year the foliage of trees in young orchards, and especially in the nursery, often wears a blighted, corroded, rusty look, and upon carefully examining it such appearance will be found to result from the gnawings of this little Skeletonizer. A badly infested orchard or nursery presents such a decidedly seared aspect that it attracts attention at a great distance; and while traveling by rail I have often pointed out the work of this insect and felt as sure of its presence in certain orchards, as though I had closely examined the trees.

The rusty appearance is produced by the worm feeding solely on the green pulpy parts of the upper surface of the leaf, and thus leaving untouched the more fibrous frame-work. In some cases the pulpy portions are eaten off very thoroughly so that nothing remains but the semi-transparent epidermis below, and the net-work of veins; but more usually a certain amount of the parenchyma is left and this it is which acquires a bright rust-red appearance. The worm always covers the leaf with loose tender silken threads, with which it mixes numerous little black, gunpowder-like, excrementitious grains; and it is under this covering that it feeds. It is semi-gregarious, either living alone on the leaf, or in company within a bunch of leaves tied together.

The worm (Fig. 21, *a*) is usually of a brown color marked on the back as at *b*, but it varies from brown to pale yellowish-brown or greenish. The markings are pretty constant, however, and the distinguishing feature consists of four conspicuous black shiny tubercles, with a pale basal annulation near the head, as at *c*.

The chrysalis is of a light brown color with no striking characters. It is generally formed among the leaves, in a very slight cocoon, and often in the folds made by a leaf-roller which is generally found in company with it. In confinement I have known the worms to go below ground where they cemented their cocoons on the outside with grains of sand.

The moth expands about 0.45 inch and has the front wings of a deep glossy purplish-gray, marked with two transverse pale bands, as in the figure (*d*). It may be popularly known as Hammond's "Knot-horn." I first received specimens of this worm in the summer of 1869, from Mr. A. C. Hammond of Warsaw, and W. T. Nelson of Wilmington, Ills. My late associate, Mr. Walsh, had intended to describe the species, and I now carry out his intention by naming it in honor of Mr. Hammond, whose experience with it, as given in the following extracts from one of his letters, will throw further light on its habits:

In August and September, 1868, I noticed that the leaves of my apple trees were being destroyed by some insect. An examination revealed the fact that the mischief was caused by a small greenish larva about half an inch long, with two dark stripes on its back. Their mode of operating appeared to be to locate themselves on or near the end of the twigs in communities of from three or four to a dozen, and form a dwelling place by webbing together a quantity of leaves with a material resembling spider's web. Within this shelter they live, feeding upon the leaves.

In June, 1869, I found the same insect at work in my orchard in great numbers. At this time the apples were about one-fourth grown, and we found that the worms generally inclosed two or three apples within the mass of leaves and that they were feeding upon these as well as upon the leaves, of course causing them to drop. Their ravages were principally confined to a few varieties. The yellow Bellflower, Winesap and Ben Davis appeared to be their favorites. They had caused fully one-half of the fruit to fall from several hundred trees in my orchard.

In Europe a larger species of a closely allied genus (*Acrobasis consociella*), which I have received from Mr. P. C. Zeller of Prussia, works upon the leaves of the oak in very much the same manner as ours does on those of the Apple; and it is one of those insects attended by a companion larva, Our insect seems to be similarly attended by two companion larvæ, namely, the two species next to be treated of. At least it is almost always found in conjunction with them. So far as we now know there is but one annual brood of the Apple-leaf Skeletonizer; but the moths issue very irregularly, and the worms may be found all through the summer, but particularly in the fall, as long as the leaves remain on the tree. I have found but partially grown worms as late as November—unfortunates that seemed doomed to a wintry death. The moths commence to make their appearance in the vicinity of St. Louis by the first of May, but I have had them issue as late as the last of July.

Remedies.—This insect, like a good many others, shows a decided predilection for unthrifty, tender trees, and careful, clean culture is the best preventive. A little hand picking at the proper time will do much to prevent its injuries, and I incline to believe that it may be extirpated by dusting the trees with air-slacked lime. I have bred from it two small Ichneumon-flies, one of which is a *Microgaster;* but during my absence last summer the specimens were destroyed by mice. The larva of some Lacewing fly (*Chrysopa*) also preys upon it, and its round white cocoon may often be found among the skeletonized leaves, and should be saved.

PEMPELIA * HAMMONDI, N. Sp. *Imago* (Fig. 21, *d*).—Average expanse 0.48 inch. Front wings glossy purplish-brown with two silvery gray transverse bands dividing the wing on costa in about three equal parts, the basal band sharply defined outwardly and always extending to inner margin, the posterior band never extending more than half way across the wing, and generally not more than one-third, illy defined. In some specimens the basal transverse band is quite narrow, with the basal space a shade paler than the median: in others the band forms a double line. In some specimens also, a narrow pale transverse line outside the second band, and a pale terminal shade, are visible. Hind wings uniformly paler gray. Under surface glossy gray, with no marks, the front wings a shade darker than the hind. ♂ differs from ♀ in the basal portion of the antennæ being curved, and the curve filled with a tuft of scales.

Described from numerous bred specimens. The species has the general facies of the European *Cryptoblabes bistrigæ*, which is a larger insect.

Larva.—Length 0.45—0.50 inch. General color olive, or pale green, or brown, with a broad dark stripe along each side of back. Tapers slightly both ways, joints 4-12 inclusive, divided into two transverse folds. Freckled with numerous pale specks and with piliferous spots, the specks often taking the form of two pale broken lines along the upper edge of dark stripe. The piliferous spots are pale with a central black dot, and are best seen in the dark specimens. On joints 4-12 inclusive they are placed 4 in a square on the middle of the back, and four more each side, the two upper lateral ones being on the anterior fold, the stigmata appearing as minute rufous specks between them. Both these spots are often double. The third lateral spot is on the posterior fold and the fourth is subventral and anterior. The hairs proceeding from these spots are long and setaceous. Head horizontal, freckled, pale behind, tinged with green in front and with a few long hairs. Joint 1 also freckled and with a large black piliferous tubercle with a pale basal annulation and in range with middle of dark stripe. Joint 2 with similar black tubercles with a white centre and replacing the uppermost lateral pale spot. There are but two of the small pale dorsal piliferous spots on this joint (between the tubercles) as well as on joint 3. Beneath immaculate, except that the thoracic legs have sometimes a few dusky dots.

In the very dark specimens the head, cervical shield and anal plate remain pale. The cervical shield is then well defined with four small piliferous specks at anterior edgae, and the large shiny tubercle forms the extreme anterior angle.

In many specimens the subdorsal dark stripe is obsolete or sub-obsolete, but even then the four black tubercles on joints 1 and 2 characterize the larva sufficiently.

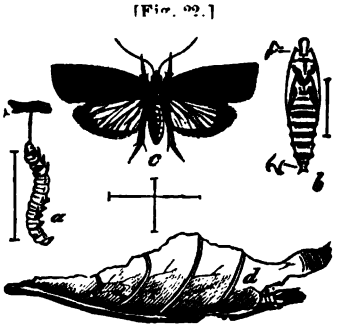
Described from numerous specimens.

Pupa.—0.24 inch long; rather stout and short, with two minute diverging spines and a few stiff bristles at tip.

THE GREEN APPLE LEAF-TYER.—*Tortrix Cinderella*, N. Sp.

(Lepidoptera Tortricidæ.)

[Fig. 22.]



In company with the foregoing Leaf Skeletonizer may almost always be found two or three different species of small green worms which aid materially in withering and denuding the leaves from young apple trees. These worms bear so close a resemblance to each other that it is almost impossible to characterize them. The species under consideration is of a uniform yellowish-green color, with the head and neck horny and a shade more tawny, the head being marked with a crescent-shaped

* Genera and families, so-called, are often instituted on such trivial and even variable characters among the smaller moths, that the proper placing of a species becomes very difficult, and ofttimes impossible. As Mr. Walsh informed me in 1869, specimens of this moth were that year sent to the English microlepidopterist, Mr. H. T. Stainton, who referred it to the genus *Acrobasis* (See Am. Ent. I p. 32). Upon carefully examining my own specimens, I found that the antennal characters of the ♂ placed it in the genus *Pempelia* rather than *Acrobasis*, and I at once suspected that the specimens sent by Mr. Walsh to Mr. Stainton were all ♀. Upon communicating with Mr. Stainton on the subject, and sending him the ♂, my supposition was verified. But, after all, as the late Dr. Clemens tritely remarked, our system of classification is yet "one of convenience and not of nature."

black mark on which are the eyelets, and another dusky spot at base on the sides (Fig. 22, *a*). It webs the leaves together, generally folding a single leaf in two, and living within the fold. Like all true leaf-folders it is very nimble, and wriggles away and drops to the ground when disturbed, while the Skeletonizer makes no especial effort to escape. In feeding, the Leaf-tyer is not confined to the parenchyma.

This worm changes to a chrysalis within a fold of the leaf, lined with silk, and when about to give forth the moth, works its way partially out at one end (Fig. 22, *d*.) The chrysalis (Fig. 22, *b*) is peculiar from having a rounded projection in front of the head. The moth (Fig. 22, *c*) is amost unassuming little body with the front wings of a dark ash-gray without a shade of any other color, the hind wings paler.

In the early part of the year this species may often be found more numerous than the Skelétonizer, but the latter predominates, so far as my experience goes, in the fall. There is much more to observe yet of its habits, and I now merely introduce it and give it a name because of its association with the preceding species. The same remedies which apply to that will answer for this.

TORTRIX CINDERELLA, N. Sp.—*Imago* (Fig. 22, *c*).—Alar expanse exactly 1-2 inch. Front wings deep glossy ash-gray, immaculate. Under a lens they have an irrorate appearance, while in cer tain lights some of the scales appear to form a series of darker transverse sinuous lines. Also scattered over the wing may be noticed a dozen or more reddish scales, which are not sufficient, however, to destroy the uniform immaculate appearance. Head, mouth-parts, antennæ, legs, and abdomen of same color. Hind wings paler and semi-transparent. Fringes of all wings concolorous. Under surface of wings pale nacreous, inclining to pale fulvous around the margins.

Described from two bred specimens.

Larva (Fig. 22, *a*).—Length 0.50 inch. Form of that of *Acrobasis nebulo*, wrinkled very much in the same manner. Color yellowish-green, the piliferous spots of the same color, but readily distinguished by their polished surface; they are placed in a transverse row on thoracic joints, and on joints 4—12 there are four rhomboidally on dorsum, two laterally on the first fold and one subventral. Stigmata between the two lateral spots, and yellowish. Head and cervical shield gamboge-yellow; only a shade darker than body; labrum and two basal joints of antennæ paler or white, the terminal joint brown; ocelli on a somewhat crescent shaped black spot (the most conspicuous character) a second dusky spot at base of head laterally. Legs immaculate.

Described from many specimens.

Pupa (Fig. 22, *b*).—Length 0.25—0.30 inch. Brown, characterized by a peculiar rounded projection from front of head; by a little pointed prominence at base of each antennæ, and each side of penultimate abdominal joint; and by terminating in a broad suppressed piece which produces two decurved hooks. Posterior rim of abdominal joints rasped dorsally, and a slight rasped dorsal ridge near the anterior edge of larger joints. Legs reaching only to end of wing-sheaths. The head-prominence varies in size and slightly in form.

THE LESSER APPLE LEAF-FOLDER.—*Tortrix malivorana*, LeBaron.

(Lepidoptera, Tortricidæ.)

This is the name given to a small pale green worm, by Dr. LeBaron,* who found it doing much damage to the young apple trees in the nursery of Mr. D. B. Wier, of Lacon, Ill., in the summer of 1870, but which almost disappeared in 1871. In habit and in size, form and color, it is the exact

* First Ann. Rep. on the Ins. of Ill., pp. 20—23.

counterpart of the Leaf-tyer just described.* The chrysalis is also similar, but the moth, instead of being uniformly ash-gray, is of a bright orange, but of exactly the same size and equally uniform in coloration; so that by imagining a bright golden orange instead of deep ash-gray, Figure 22, *c*) would answer for this species.

I have little doubt but this worm is also very generally associated with the Skeletonizer, as I found the latter had been quite abundant in Mr. Wier's nursery last fall; and it very probably helped in some degree to cause the blasted appearance of the nursery which was attributed solely to the Lesser Leaf-folder the year before.

In the *Prairie Farmer* for February 10th, 1872, M. Wier gives the following account of the habits of this Lesser Leaf-folder:

This is one of those ephemeral, and as we might say, local insects, that often do great damage at some point, and may not be troublesome again in that locality for years.

Our nurseries were scourged with it during the summer of 1870 to so great an extent that from the twentieth of June until the first of September, hardly a green leaf could be found on the younger trees.

My attention was first called to it in the fall of '63, by a neighboring nurseryman, who wished me to call and see how the Codling moth (as he termed it) had injured his apple seedlings.

His acre or more of seedlings could have looked no worse if they had been sprinkled over with dry straw, and burned over, yet, as was the case in our nursery, there was scarcely a Tortrix to be seen the succeeding summer, and his seedlings made a very strong growth. I next saw it in my nursery in June '64, when it swept over a large lot of two-year-old apple trees in June, but did no serious damage, as there appeared to be but one brood. It was next seen as stated above about the 12th of June, 1870, involving the entire apple nursery here, and more or less the orchards. At that time the caterpillars were about half grown, but were not numerous enough to do serious damage. They commenced to change to chrysalids about the 20th of June, and in three to four days, the little bright orange moths were flitting around amongst the trees, depositing the eggs for another brood of worms. The eggs soon hatched, and as the second brood of worms was at least one hundred times more numerous than the first, the trees soon began to show signs of damage. I did not determine positively, but I am quite certain that this brood changed to moths in about thirty days, or the 20th of July, and they at once laid their eggs, increasing perhaps fifty fold (enemies had begun to prey upon them). They matured about August 20th, and laid eggs for another brood, about equalling the second. These so far as I could see were all killed by frost, that were not destroyed by their natural enemies, when about two-thirds grown.

The first thing that will be noticed where it is present, is that in looking along nursery rows, leaves will be seen with large reddish-brown spots on them. A close examination will show that these leaves have been folded upwards until their edges met, and are closely fastened together with fine silken threads. Grasp the leaf between the thumb and finger, open it carefully and a small, greenish, very lively caterpillar will be found between the folds, and if you do not grasp the leaf so as to squeeze it, the worm will wriggle out and fall to the ground. It has a pale, amber-brown head, and in many individuals the whole body is of a brownish tint, especially on

* Specific differences may yet be discerned, as Dr. LeBaron has not very minutely characterized his larva.

the anterior portion, and when near mature. We do not usually observe the caterpillar until well grown, for the reason that when first hatched it appears to be in the centre of the opening bud, out of which it eats the heart, and of course stops the growth, leaving generally only three to four leaves to expand. It soon chooses one of these and folds it up as above, and then feeds on its upper cuticle, which makes the conspicuous brown blotches on the exposed side, or under side of the leaf. One leaf is generally more than sufficient to feed the caterpillar. When mature it lines the sides of the leaf with soft white silk, and changes to a dark mahogany-brown chrysalis; about three-tenths of an inch long, slender and lively; its most distinguishing point is a little knob terminating its anterior extremity. In a few days these chrysalides change to bright orange-colored moths, three-tenths of an inch long and spreading their wings about half an inch.

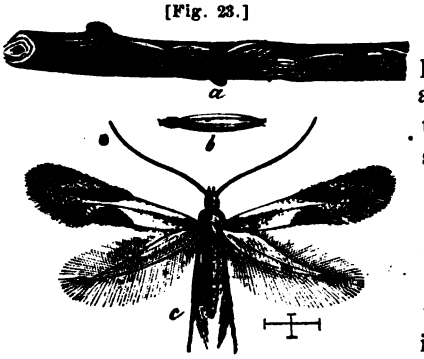
There is no noxious insect, that has come under my observation, that is more difficult to combat successfully than this. There appears to be no way of getting at it with any of the remedies usually employed for destroying such insects. While it is young it is too inconspicuous to be seen, and is always covered by a close web, or hid in the folds of the young leaves, and when it becomes larger it is snugly sealed up between the folds of a leaf, at all times out of reach of liquid or dry applications.

The only remedy that I can suggest is the tedious one of looking over the trees about the time the first brood of larvæ are coming to maturity, carefully picking the injured leaves off, with the worms in them and destroying them. Yet the little things are so delicate, and so easily destroyed by natural causes, that our labor in doing this would be more than half the time thrown away, for the reason that a first brood is no sure sign that there will be a second, and a second that there will be a third; the weather must be continuously dry and hot for them to breed to a noxious degree. Thus, we had here ten times as numerous a first brood the spring of 1871 as we had the spring of 1870; yet the last season they did but little harm, while the year before they swept everything before them. Yet these two seasons were quite similar in this neighborhood, and the difference in their ravages can only be accounted for on the hypothesis that being numerous two years in succession in the same place, their natural enemies bred up also, and destroyed them.

THE APPLE-LEAF BUCCULATRIX—*Bucculatrix pomifoliella, Clem.*

(Lepidoptera Tineidæ.)

[Fig. 23.]



This is a small insect hitherto comparatively little known, and which yet attracted some attention during the past two years. It was sent to the office on several occasions for name, and was found, though by no means abundantly, in several orchards, and more especially in that of Mr. T. R. Allen of Allenton. It cannot be classed as a very injurious insect with us, but to illustrate how unduly multiplied it may at any time become, and the importance of a proper knowledge of its habits, I

will quote the following paragraph which was addressed last spring to the *Rural New Yorker:*

While visiting the grounds of I. M. Babcock & Sons in Brighton, near Rochester, N. Y., we entered a field of eight hundred apple trees in the very zenith of their bearing capacity, loaded down with the finest of winter fruit. But my attention was directed to the branches of the trees, which, to my utter surprise, were thoroughly lined with these insects or minute worms inclosed in their silk-like cocoon, and tightly attached to the small branches which you will readily perceive; also the leaves of the trees are infested with a similar worm incased within the leaf, from one-fourth to one-half an inch in length—what some would call the leaf-rollers. The effect of their ruinous work on the trees is to almost denude them of their leaves, and greatly to diminish the future prospects for fruit. Now, Mr. Editor, through the *Rural New Yorker*, we shall look for some solution of the nature and character of this most formidable enemy that has appeared upon our apple trees. I send you a branch that has the insects on, and the leaf which I believe contains the parent, which is the cause of all the mischief. Will you have this subject investigated by competent hands, and report through the *Rural?*

H. N. LANGWORTHY.

The little worm which is the cause of such mischief feeds externally upon the leaf, and is quite active, letting itself down by a web when disturbed. It measures, when fully grown, nearly one-half inch in length, and is of a dark green color, with the joints swollen so as to look like a series of beads, with a small head held horizontally, and with sparse, short hairs over the body. It has the normal complement of legs, namely, ten false and six true ones. When full grown it spins a dirty white cocoon, which is characterized by being ribbed longitudinally (Fig. 23, *b,* represents one enlarged). Within this cocoon it soon assumes the pupa state, in which state it is of a dark brown color, rough-punctured on the back, and with a smooth, polished anal cap. The pupa works itself partly out of the cocoon and gives forth a little moth (Fig. 23, *c,* enlarged, the hair lines showing the natural size), which is of a dirty-white, or gray color, marked with brown as in the figure. It was first described in the Proceedings of the Academy of Natural Sciences of Philadelphia, for 1860, p. 211.

In this latitude the worm does its principal damage during the month of September, and the greater number of cocoons are formed during the latter part of that month and during October. The moths commence to issue in April, and immediately deposit their eggs on the tender leaves. Fresh cocoons I have found as early as the first of June, and there are at least two, and perhaps more, broods of the worm during the year.

REMEDIES.—The great peculiarity of this insect is its habit of forming its little ribbed cocoon in company on the bark—a habit which at once gives us the mastery over it; for as the pupa remains in the cocoon all through the winter, we can make war upon it at any time during that season. When the insect is abundant these cocoons will absolutely cover the smaller twigs in the manner shown at Figure 23, *a*; and they will be found even on the larger branches and trunk. Anything applied to the tree with the object of killing these pupæ, must be of an oily nature, so as to readily soak through the

cocoon. I have experimentally proved that an application of kerosene oil is death to them, and though I have had no opportunity of testing it on an extensive scale, I have little hesitancy in advising its use, or that of linseed oil. Alkalies might also be tried. The best time to apply the remedy would doubtless be in March, when tree-growth recommences; but it must not be delayed beyond the end of that month, when the moths commence to issue. The most expedient way of applying the kerosene would be by aid of a force pump and spray machine or atomizer, and it would pay well to first vigorously prune a tree that is badly infested. The kerosene will not injure the tree if applied in a diluted form; and it may be so applied by means of the spray machine.

The only other injurious insect known to form cocoons in company is a little species belonging to the same genus (*B. thuiella*, Pack), which is described by Dr. A. S. Packard, Jr.,* as being common on the leaves of a cedar tree (I presume the Red Cedar is intended), but whose cocoon is smooth instead of ribbed. This species, which I have not met with, is preyed upon by a minute Chalcis-fly, allied to the genus *Eulophus*, and our apple-leaf Bucculatrix is similarly attacked by some such parasite, as many of the cocoons may be found with minute round holes at one end, through which such parasites have issued.

BUCCULATRIX POMIFOLIELLA, Clem.—*Larva.*—Cylindrical and submoniliform; tapers anteriorly and posteriorly; with punctiform points and isolated hairs; first segment with rather abundant dorsal hairs; thoracic feet three; abdominal four and very short, terminal one pair. Head small, ellipsoidal, brown; body dark yellowish-green, tinged with reddish anteriorly; hairs blackish and short.—Clemens.

Pupa.—0.12 inch long. Amber-brown. Head often ending in a little point. Dorsum shagreened, except a hind rim on each joint which is slightly ridged and smooth. Penultimate joint longest and most slender. Apical joint blunt, with an anterior carinated, transverse ridge above and sometimes forming a point at each side. Legs reaching to penultimate joint; wing sheaths (which are paler) to the preceding one.

THE APPLE-TWIG BORER— *Bostrichus* [*Amphicerus*] *bicaudatus*, Say.

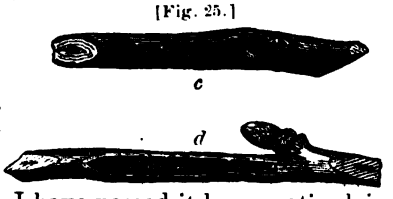
(Coleoptera, Ptinidæ)

[Fig. 24.]

a. *b.*

There is a little brown cylindrical beetle, which is so common in Missouri, and is so very apt to attract the notice of nurserymen, that numerous specimens are received at my office every spring and fall. I have passed it by unnoticed in previous reports, in hope of completing its natural history before treating of it; but to satisfy the numerous inquirers, I present the above figures with the accompanying short account of the beetle.

[Fig. 25.]



c *d*

* First Ann. Rep. on the Inj. and Ben. Ins. of Mass. p. 24.

It is a modest looking dark brown insect, varying from 1-5th to 2-5ths of an inch in length, the thorax rounded and rough-punctured, especially in front where it is produced into two little horns, and covered with small rasp-like prominences. The wing-covers are also rough-punctured, and while in the female (Fig 24, *a*) they have but a slight keel-like elevation at the hind end, they are furnished in the male (Fig. 24, *b*) with two little horns, from which characteristic the specific name (two-tailed) is derived. The species is not mentioned by Harris, and does not occur on the Atlantic seaboard, but is found in the whole country between the Alleghany and Rocky Mountains, becoming more and more common as we progress westward, and being most common in the States immediately west of the Mississippi. Its range southward is at least as far as Texas.

The holes made in the twigs, generally have their entrance just above a bud or fork as at Figure 25, *c*. I have never known this insect to bore more than one and a half inches into the twig (Fig. 25, *d*), and the holes are generally made downwards, and in wood of the previous year's growth, though I have seen them exceptionally bored upward and in three-year-old wood. The beetles seem to prefer some varieties, such as Benoni and Red June, to other varieties of the Apple, and though they likewise occur in grape, pear and peach stems, I have never found them in those of the crab apple.

Both the male and female beetles bore these holes, and may always be found in them, head downwards, during the winter and spring months. The holes are made for food and protection, and not for breeding purposes. Indeed, common as this insect is, its preparatory stages are entirely unknown, and that person who will ascertain its larval history, will confer a favor on the community. I have bred a very closely allied species (*Sinoxylon basillare,* Say), which not only inhabits the wood of apple trees, but is found in that of peach and hickory trees and in grape canes. Its larval habits, which I shall presently illustrate, will throw some light on those of our Apple-twig Borer.

Indeed, according to Mr. S. H. Kriedelbaugh, of Clarinda, Iowa,* both sexes of this last have been found in company during the winter, in the sap-wood of "forest trees;" and though we are not informed as to the particular kind of forest trees, yet, since the Oak is the most common in our forests, we may infer that this tree is intended, among the rest. The probabilities are, therefore, that our Twig Borer breeds under the bark of oak trees, and that it is in such situations that we must search for its larva.† That it so breeds in the forest and not in the orchard, is rendered still more probable when we consider that its larval habits have so long evaded de-

* *Western Pomologist,* Nov. '71.

† It may, and doubtless does, breed in other kinds of wood besides oak. I have often found the beetles boring into grape-canes for food and shelter, with no other indications of breeding in them, than we find in apple twigs similarly bored. Dr. Henry Shimer, in a communication to the American Entomological Society, in September, 1868, speaks of finding them in grape-canes, and he also found certain larvæ in such canes, which he conjectured were the larvæ of *bicaudatus*. But, notwithstanding Dr. Packard (Guide p. 472), in speaking of the species, briefly describes its larva which he received from Dr. Shimer, it is evident that the latter gentleman has given no proof of the soundness of his conjecture, and, as he informs me by letter, he cannot now find his notes on the subject. And since, so far as it goes, the description accords with the larva of *Sinoxylon basillare*, Say, which, as I shall presently show, inhabits grape-stems; the probabilities are that Dr. Packard's description was, in reality, from this last named species.

tection. We may furthermore infer that it comes to maturity late in the summer, and, flying into our orchards and vineyards, the beetles bore into twigs during the fall. Here winter overtakes them, and they hibernate in the holes, some of them dying; but most of them surviving till spring, when they continue feeding for a while, and afterwards repair to the forest again to propagate their kind. I have caught both sexes flying as early as the middle of March, during genial, sunny weather.

The bored twigs most always break off by the wind, or else the hole catches the water in spring and causes an unsound place in the tree. If the twig does not break off, it withers and the leaves turn brown. The only way to counteract the injuries committed by this beetle, is to prune the infested twigs, whenever found, and take great care to burn them with their contents. It is in the nursery that most injury is done, as the insect is seldom numerous enough in an orchard of large trees to more than cause what the philosophic orchardist has been wont to term "a good summer pruning."

The genus *Bostrichus* was formerly considered the type of a Family (BOSTRICHIDÆ,) to which older authors referred our insects; but the family is now generally united with the PTINIDÆ, to which *bicaudatus* is consequently referred.

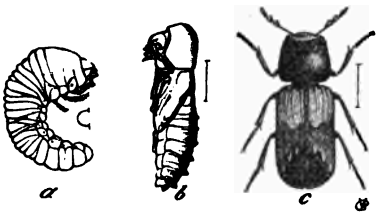
INSECTS INJURIOUS TO THE GRAPE-VINE.

In continuing the articles under this head, considerable space is devoted in this Report to the Grape root-louse, as it is deemed of most importance. As illustrative of the habits of the Apple-twig Borer, I will, however, first introduce—

THE RED-SHOULDERED SINOXYLON—*Sinoxylon basillare*, Say.

(Coleoptera, Ptinidæ.)

[Fig. 26.]



a *b* *c*

This insect is not so commonly seen in the beetle state as is the preceding, but unfortunately it is much better known in its larva state; and as it belongs to the same Family and is very closely allied to the Apple-twig Borer, its habits in the early stages may serve as an additional clue to those of its close ally, and the accompanying figures of the larva and pupa of the *Sinoxylon*, may be considered illustrative of the general appearance which the yet unknown larva and pupa of the *Bostrichus* will present.*

* It will by no means follow, however, that because the larva of *Sinoxylon basillare* has legs, that of *Bostrichus bicaudatus* has legs also; for many *Bostrichus* larvæ are known to be legless.

This beetle (Fig. 26, *c*) is black, but easily recognized by having a large reddish spot at the base of each wing-cover.* It measures about 1-5th of an inch. The antennæ and palpi are rufous. The thorax is punctured and armed with short spines in front. The wing-covers are rough-punctured, and have the appearance of being cut off obliquely behind, the outer edge of the cut portion being armed with three teeth each side. The larva (Fig. 26, *a*) is a yellowish, wrinkled, arched grub with a very small head. The thoracic joints are swollen and furnished with six small legs.

The pupa (Fig. 26, *b*) is formed in the galleries gnawed by the larva. It is pale-yellowish, and exhibits the characters of the future beetle.

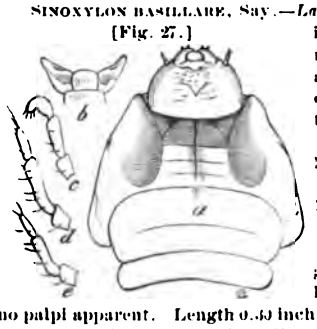
Last spring Dr. C. W. Spaulding, of Kirkwood, brought me certain grape stems which were being badly gouged under the bark and bored more or less in the heart, by a small grub. He met with such injured grape-stems quite frequently, and feared that the insect which caused the trouble might become a serious impediment to grape-growing. The beetles most numerously reared from these canes proved to be the Red-shouldered Sinoxylon.†

Dr. Harris (*Inj. Ins.* p. 92), and Dr. Fitch after him (3d Rep. § 158), speak of this insect as living in the trunk of the Shagbark hickory, boring holes straight towards the heart of the tree, and changing to the pupa state at the inner ends of their burrows.‡ But this is not the height of its offense, for I have found it boring into apple trees, and Mr. J. M. Beecher, of Newport, Franklin county, has forwarded me a number of specimens with the statement that he finds them penetrating to the heart of the trunk and main branches of some of his peach and apple trees, and they have caused the death of two of the former and one of the latter kind.

The only way to get rid of this pest is to burn the infested wood.

SINOXYLON BASILLARE, Say.—*Larva* (Fig. 27, head and thoracic joints enlarged)—Color yellowish. Body smooth, arched and wrinkled transversely. Thoracic joints much enlarged, the prothoracic being slightly horny at the anterior margin above. Six setous legs carried forward close to the body, the first pair (Fig. 27, *c*) bent closely under the head, the second pair (*d*) longer and straight, the third pair (*e*) short. Stigmata 9, and very difficult to detect. *Head* small, horny, rounded, rather darker than body: antennæ conspicuous, 3-jointed; epistoma dark brown, not as wide as labrum; labrum dark brown, rounded, covered and fringed with stiff hairs; mandibles stout, jet black, triangular, edges entire (*b* representing them when open); maxillæ very small with an elongated basal piece, and an inner lobe covered with hair; maxillary palpi with two indistinct joints; labium inconspicuous with no palpi apparent. Length 0.50 inch.

[Fig. 27.]



Described from three alcoholic specimens.

Pupa (Fig. 26, *b*).—Yellowish, elongate, with all the parts of the future beetle distinct, the head at right angles with thorax, the antennæ laid straight under the thorax, the last pair of legs, except the tarsi hidden under the wingsheaths. Length 0.30 inch.

Described from several specimens.

---

* Some specimens occur which are entirely black, the reddish spots being obsolete; but they are exceptional.

† I have also reared from similar canes *Callidium amœnum*, Say, and Dr. Shimer in the paper alluded to, on page 52, states that he has likewise bred this species as well as *Lyctus opaculus*, Lec. I have also bred *Elaphidion parallelum*, Lec. abundantly from such canes.

‡ Dr. Geo. H. Horn (P. E. S. P. I, p. 29) also refers to this larva as infesting hickory trunks, but neither of these authors give any description of the larva.

GRAPE DISEASE.

On the Cause of Deterioration in some of our Native Grape-vines, and one of the probable reasons why European Vines have so generally failed with us.

THE GRAPE-LEAF GALL-LOUSE—*Phylloxera vitifoliæ*,* Fitch.

The experience of the past year, enables me to add much of interest and importance to last year's account of the above insect. This experience has already been made public in an article published in the *Rural New Yorker*, and reproduced in the *Rural World* of St. Louis. I am pleased to know that the views there set forth receive the indorsement of such an experienced and practical man as Mr. Geo. Husmann, the well known grape authority in our State, and editor of the vineyard department of the last-named journal.†

It is well known that nearly all the varieties of the European grape-vine (*Vitis vinifera*) have, in the end, proved valueless when introduced and cultivated in the eastern half of the United States. The majority of them grow well at first, and a few exceptional cases might be mentioned where

---

* This is the specific name by which I last year gave an account of this grape-vine insect; and I employ it again for that very reason, and for the further reason that it is the name most familiar to the American reader. I have already given my opinion (3rd Rep. p. 95, note) that though the name is objectionable, it ought perhaps to be retained. It is doubtful, however, whether many other entomologists will agree with me; and while I believe in carrying out the "law of priority" to its fullest extent, consistent with reason, there are many cases where it must give way to that of "accord." The present is perhaps just such a case; for aside from the technical objection, Dr. Fitch knew so little of the insect's true characters, when he named it, that he cannot be said to have described it, and did not refer it to its proper genus which was already erected to receive it. His name will, therefore, doubtless give way to that of *Phylloxera vastatrix*, which Planchon first gave to the root-inhabiting form, and which has generally been recognized abroad. The same may be said of Westwood's name *Peritymbia vitisana*, which was also proposed for the same insect in 1868, in a communication to the Ashmolean Society of Oxford, England.

While I would not, therefore, carry out the "law of priority" too relentlessly, I have no sympathy or patience with a certain modern system of attaching to an insect the name of the author who erects the last new genus, instead of that of the describer of the species. This pernicious system—which if not frowned down, will lead to utter confusion and land us in absolute chaos—seems to be getting more and more fashionable among naturalists in this country, and I regret to say, among some entomologists. That man, in my opinion, is no true naturalist, who can pass through the museums of this country and witness the manner in which the names of the older authors are ignored, without feelings of just indignation! He will very naturally look upon it as an attempt on the part of modern ingrates to rob well-earned and long-worn laurels from the older authors, whose spirits still survive, if their bodies are prevented by the grave, from rebuking the insult. Aside from the moral injustice of such a rule, it is hurtful to any science in its practical application; for, as genera multiply, the student will find increasing difficulty in referring to original descriptions; whereas, by the old established rule, the describer's name is an infallible index. In lists or catalogues, such as that of *Coleoptera* by LeConte, and that of *Bombycidæ* by Grote & Robinson, where the synonyms are given, this difficulty does not present itself, though the moral objection remains. As the science of entomology grows, and synonymy multiplies, it will, in my opinion, become more and more necessary to attach the author's name to a species in ordinary works, and any system which will require a continual changing of authorship should not be countenanced. Species—however much they may be changed and modified in the course of ages—have for all the purposes of the naturalist a permanency which under the old rule would render our specific nomenclature like permanent, and secure it against constant change; whereas, genera—though in the proper sense they may have a similar permanency—are, for all practical purposes, more the creations of man than of Nature; and as they have been unstable and changeable in the past, so they will be in the future, and our generic nomenclature will ever have an indefinite, protean, insecure character.

In Europe this system is almost universally ostracised; and—let botanists and ornithologists do as they please—it is to be hoped it will not grow in favor among entomologists in America. It was not followed by any of the older authors, and I am glad to know that some of our leading living entomologists, including Dr. G. H. Horn, Mr. E. T. Cresson, Mr. P. R. Uhler, Mr. J. A. Lintner, Dr. Asa Fitch, and Dr. LeBaron, are opposed to and do not adopt it. In these Reports—however prevalent the contrary fashion may become—I shall always attach to the species the name of its first describer; and shall never change the orthography, even of a name that may be grammatically objectionable, until corrected by the author himself.

† Mr. Husmann says: (*Rur. W.*, Nov. 18, 1871); "We copy the following from the *Rural New Yorker*, and think it one of the most interesting papers we have read for a long time—one that will be of more use to the vintner in his selection of varieties, and throw more light on the deterioration of formerly healthy varieties than anything that has been said or done lately. The grape growers of the country owe Prof. Riley a debt of gratitude for his thorough and scientific investigation of this subject."

some of them, such as Black Hamburg and Chasselas, have even fruited successfully for many years, especially when isolated or trained against walls; while they more generally do well when isolated in cold houses. But the general truth of the first statement holds good. It is also well known that some of our native vines, which for a while were universal favorites on account of their productiveness, vigor and other excellent qualities, have of late years sadly deteriorated. Among such the Catawba was for a long time the popular grape; but its cultivation is now entirely abandoned in many parts of the Mississippi Valley, and even at Hammondsport and other parts of New York, and Nauvoo, Illinois, where it is still largely cultivated, I learn from experienced grape-growers that it is fast on the decline.

This deterioration—this failure, has been attributed to a variety of causes, for in the absence of anything definite and ascertainable to keep it within bounds, the speculative turn of our minds is sure to have full scope and grasping at every shadow of probability, leave no possible theory unsearched. As in all such cases, also, the mind gets lost in, and is satisfied to vaguely rest with, the theory least provable; and to some occult and mysterious change of climate we are at last satisfied to attribute the change though if the meteorological records were carefully examined, they would probably show no difference in the mean annual condition of our climate during the past half century.

It is very natural to suppose that vines of European origin should be less hardy in this country than our native varieties, that as in the case of the Spanish Chestnut, the English Gooseberry, etc., etc., there is something in our climate which precludes their flourishing as well here as there. I would by no means deny that such is the case, for it is this very comparative tenderness which predisposes them the more to the destructive agent of which I am about to speak. Yet when we consider that in some parts of Europe, where the Vine flourishes, the extremes of heat and cold are as great as here, that we possess a great variety of soil and climate, and that by covering and other modes of protection in winter, we may, where necessary, counteract the rigor of the latter—it would appear that we certainly have attributed too much to climatic influence: and such a view is strengthened by the fact that our native varieties, if free from the insect which forms the subject of his article, usually do well when cultivated in Europe, and further that the *Vitis vinifera* is not a native of Europe, but of western Asia.

The above reflections are of a general character, but apply more particularly to the great State of Missouri, which is admitted to be, in many parts, eminently adapted, both by soil and climate, to the cultivation of the Vine.

One of the reasons why the European vines do well in California, outside of and beyond the more favorable clime in that portion of the continent, is, no doubt, because the insect which here affects them, like many other species common on this side of the Rocky Mountains, has not yet crossed to the other side. If such is the case, our California neighbors should take warning from Europe, and guard, if possible, against an invasion.

The announcement that I have at last ascertained one of the principal causes—if not the sole cause—of this decline, and that, knowing the cause, we may in a measure obviate it, will doubtless cause many a grape-grower to wonder. Some may even pooh-pooh the idea, and deem it impossible that they have so long remained in ignorance of so important a fact, that a "bug-hunter" should discover it at last. Let the facts speak.*

This destructive agent is none other than the little insect we are now treating of.

The general history of the louse, and the habits of the gall-inhabiting type were sketched in my last Report, and need not be repeated.

FURTHER PROOF OF THE IDENTITY OF THE AMERICAN INSECT WITH THE EUROPEAN.

That the two are identical there can no longer be any shadow of a doubt. I have critically examined the living lice in the fields of France, and brought with me, from that country, both winged male and female specimens, preserved in acetic acid. I find that the insect has exactly the same habits here as there, and that winged specimens which I bred last fall from the roots of our vines, accord perfectly with those brought over with me. In the different forms the insects assume, in their work, and in every other minutia—the two agree.

WHY I CONSIDER THE GALL-LOUSE AND ROOT-LOUSE IDENTICAL.

Firstly, wherever this insect has been noticed in England, both the gall-inhabiting and root-inhabiting types have been found. In France the galls occur abundantly on such of our American varieties as are subject to them here, while a few have occasionally been found on their own varieties. Secondly, I have successfully transferred the leaf-lice on to the roots, while M. V. Signoret has succeeded in obtaining leaf-galls from lice hatched on the roots. Thirdly, the winged form obtained by Dr. Shimer from the galls in this country agrees in its characters with those from the roots. Fourthly, the nodosities on the roots are, as already stated, perfectly analogous to the galls on the leaves, and differ only in just such a manner as one would expect from the difference in the plant tissues—a view greatly strengthened by the fact that when the gall-lice are forced, by their excessive numbers, to settle on the tendrils or leaf-stalks, they produce swellings and knots approaching more nearly to those on the roots than to the galls. These

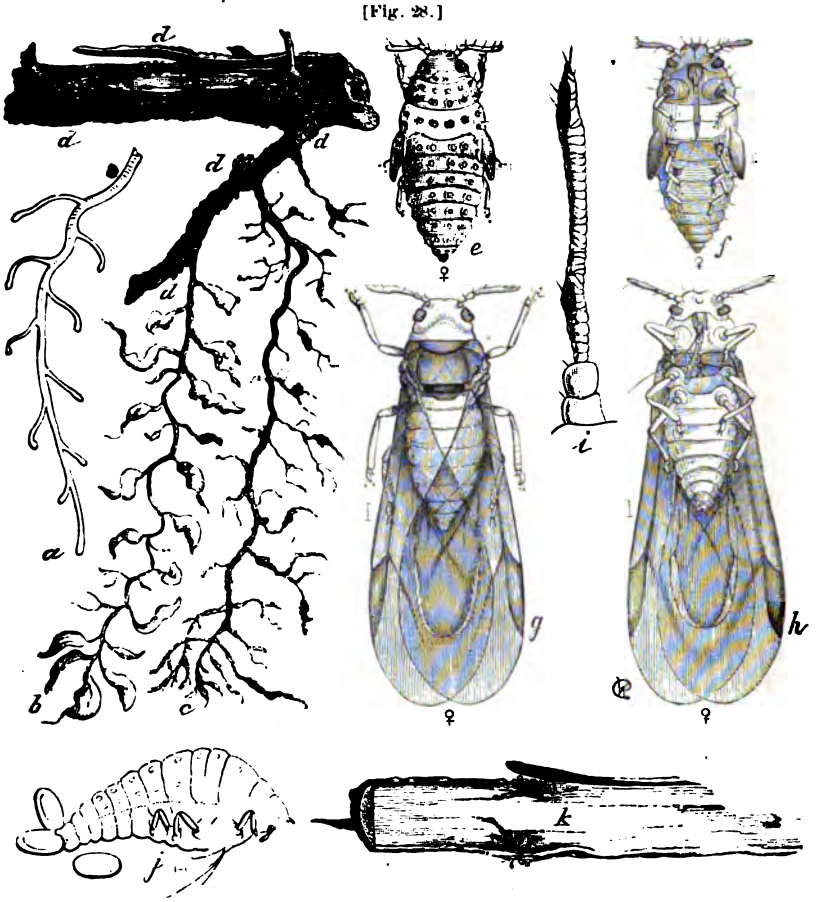
* It is really amusing to witness how the facts here set forth have been received by those who never spent ten minutes investigation of the subject in their lives. In the silkworm disease that has of late years been so prevalent in Europe, M. Pasteur, after the most painstaking and elaborate experiments, at which he sacrificed his health, unraveled its mysteries, gave to the world the true pathology of *pebrine*, and what is more, showed how it might be eradicated. Yet, as I shall show further on, the men most interested were very slow to believe the hard, dry facts which had been snatched from the unknown, and—never having studied the case themselves—were more inclined to consider the disease as something mysterious—something altogether beyond man's understanding, and consequently uncontrollable. The most ignorant are always the most skeptical! I might mention several parties who have expressed their opinion that the *Phylloxera* has no connection with disease or decline in the Vine. To such, I simply say: examine for yourselves, before giving an opinion. Others whom I might mention go to the other extreme and assert that it must be the cause of mildew, oidium, etc., and without any good reason put a similar opinion in my mouth. To these last, I say: Read aright, do not misconstrue, and by no means jump to conclusions!

facts sufficiently attest the identity of the two types, and we have here another case of an insect possessing two distinct habits. It is also like many others of its Family, polymorphic, *i. e.*, it exists in different forms; yet we have to do with but one species.

FURTHER FACTS RESPECTING THE HABITS OF THE ROOT-INHABITING TYPE.

The young hatched from the eggs on the roots are absolutely undistinguishable from those hatched in the galls; and the gravid apterous female differs in no respect whatever from the mother gall-louse. There is, however, a different egg-depositing form, which, as it moults, becomes tubercled, and more elongated or pear-shaped, as shown at Figure 28, *j*. Some of these tubercled individuals remain without wings, while others seem to be

[Fig. 28.]



EXPLANATION OF FIGURE 28.—*a*, shows a healthy root; *b*, one on which the lice are working, representing the knots and swellings caused by their punctures; *c*, a root that has been deserted by them, and where the rootlets have commenced to decay; *d*, *d*, *d*, shows how the lice are found on the larger roots; *e*, female pupa, dorsal view; *f*, same, ventral view; *g*, winged female, dorsal view; *h*, same, ventral view; *i*, magnified antenna of winged insect; *j*, side view of the wingless female, laying eggs on roots; *k*, shows how the punctures of the lice cause the larger roots to rot.

destined from the first to acquire wings. The young, after attaching themselves, become in a measure stationary, and remind one very much of young bark-lice. The fine hair-like setæ, which in their functions and elasticity are analogous to our tongue, become loosened from the more fleshy rostrum or sheath, as shown at Figure 28, *j*, and are often so firmly inserted into the root that the louse, if disturbed from its place, generally hangs by them. Three of the threads of this tongue are sufficiently conspicuous, but there should be, from analogy, four. The females on the roots seem to be less prolific than those in the galls, and their eggs if anything are rather larger. These eggs are always of a bright yellow color, and, on the dark root, are detected with the naked eye as readily as the lice, which become darker or of a dull orange as they grow older.

The insect is found on the roots in all stages during the summer months. In the winter it is found dormant, principally in the larva state, and no eggs are to be seen. With the circulation of the sap in spring, the activity of these young recommences, and in a short time afterwards eggs are deposited again. At this season the punctures of their little beaks produce very decided swellings and an excess of moisture at the wounded parts. The winged forms are by no means uncommon and commence to issue from the ground perhaps as early as July. When I last examined the roots before my departure, or about the middle of May, no pupæ were found; but winged insects were obtained as early as July in France, and after my return I had no difficulty in obtaining all I wished, especially during the latter part of September. The pupæ are easily recognizable with a good lens, by the little dark pad-like wing-sheaths at the sides of the body (Fig. 28, *e*, *f*)—and the sexes may even be distinguished at this stage by the greater constriction of the body near these pads in the female, compared to the male, her abdomen being larger. Before giving forth the winged insect, these pupæ become quite restless and active, and in a state of nature they no doubt issue from the ground.

The winged female (Fig. 28, *g*, *h*), seems to be much more common than the male, and is distinguished by her more lengthened abdomen—the wings, when closed, extending not much more than its length beyond the tip, while in the male they extend more nearly three times its length. The dusky thoracic band is not so distinct and the abdomen is more produced at the apex in the male; and there is also a slight difference in the venation of the wings of the two sexes, which venation is best seen in the fresh specimens, as it becomes in a measure obsolete in drying. In the abdomen of the female two or three large eggs are plainly visible, especially after being soaked in acetic acid. The two-jointed tarsus or foot is also plainly visible in such specimens, and I have found the joint movable, while M. V. Signoret, of Paris, has obtained the skin of the tibia or shank with the basal joint of the tarsus hanging to it. Prof. Westwood also refers to a short basal tarsal joint in the gall insect which he described. These facts, trivial as they may appear, are very important in a scientific view, as they forever settle the differences that have existed as to the proper systematic position which the louse occupies.

SUSCEPTIBILITY OF DIFFERENT VINES TO THE ATTACKS OF THE LOUSE.

I have carefully examined a great many different kinds of vines within a circuit of thirty miles of St. Louis, as well as in Cole, Jefferson and Boone counties, in this State, and the summary which follows indicates the susceptibility of the different varieties to this disease. There may be objection on the part of some persons to the placing of some of the varieties in the following tables; and the opinions both of botanists and vine-growers are so at variance that I shall give in the subsidiary note* my reasons for

*CLASSIFICATION OF THE N. A. GRAPE-VINES.—In few genera of plants, is it more necessary to accumulate abundant material in order to arrive at correct classification, than in the genus *Vitis*. The species are with difficulty defined, as they vary in a marked manner in different sections of the country; and the foliage of the same individual vine often varies greatly at different ages and seasons. Preserved leaves are not alone to be trusted, therefore, but every stage of growth must be considered, from the wood to the different leaves, the blossom, bunch, berry and even the seed, which in its shape, and especially in the development of its raphe (or cord) furnishes, according to Dr. Engelmann, some of the most permanent distinguishing traits between the species.

It is interesting to know that not a single real species has been added to those belonging to the old territory of the United States, east of the Mississippi river, since the time of Linnæus and Michaux; though Rafinesque, LeConte, and perhaps others, have attempted to distinguish a great many more.

The number of Grape-vines bearing edible fruit,* now considered species by the best botanists, in the territory of the United States, is limited to 9. They may be tabulated as follows:

I. Vines which are of practical consequence, as having yielded our different cultivated varieties.

1. VITIS LABRUSCA, Linn. Northern Fox.
2. " ÆSTIVALIS, Michx. Summer Grape.
3. " RIPARIA, Michx. River Bank Grape.
4. " VULPINA, Linn. Southern Fox, or Muscardine.

II. Vines of less consequence, and which have thus far given no cultivated varieties.

5. VITIS CORDIFOLIA, Michx. Winter or Frost Grape.
6. " CALIFORNICA, Benth. Confined to California.
7. " ARIZONICA Engelm. Similar to the last.
8. " CANDICANS, Engelm. Mustang Grape of Texas.
9. " RUPESTRIS, Scheele. Bush Grape or Sand Grape.

Of these 9 species only 4 grow wild in our own State, viz: *æstivalis, cordifolia, riparia,* and *rupestris*.

In stating last year (3rd Rep. p. 90) that our cultivated varieties had been referred to four species, including *cordifolia* and omitting *riparia*, I followed the later editions of Gray's Manual, in which the latter is considered as a variety of the former. The reasons for adopting a different course will be found in the following synopsis which has been kindly prepared for me by the author:

THE TRUE GRAPE-VINES OF THE OLD UNITED STATES.

BY DR. GEORGE ENGELMANN, OF ST. LOUIS.

I. Grape-vines with loose bark (at last separating in shreds), climbing by the aid of branched tendrils, or (in No. 4) scarcely climbing at all.

a. Berries small, 3—6 or rarely 7 lines in diameter; seeds obtuse, with the raphe (or cord) more or less prominent (except in No. 4) over the top. All the species of this group, just like the European grape-vine, exhibit on well grown shoots a regular alternation of two leaves each having a tendril (or its equivalent, an inflorescence), opposite to them, and a third leaf without such a tendril.

1. VITIS CORDIFOLIA, *Michaux*—Usually tall, climbing high, trunks not rarely 6—9 inches in diameter. Leaves middle sized, heart-shaped, mostly entire or rarely slightly tri-lobed, with shallow broad teeth, usually smooth and shining on both sides, the young ones sometimes slightly downy below; berries among the smallest; in large bunches, black without a bloom, maturing late in the fall, usually with only one short and broad seed marked by a prominent raphe.

This is a common plant especially of the river-bottoms, and well known under the name of Winter grape, Frost grape or Chicken grape. It is found from New England to Texas, and westward to the western limits of the wooded part of the Mississippi valley. In this valley, at least, the fruit has a

*There are a few species forming the sections (or according to others, genera) *Cissus* and *Ampelopsis* which are now classed with *Vitis*; but they bear no edible fruit, and are otherwise easily distinguished from the true Grape-vines.

so placing them. I am familiar with the views of many of the leading grape-growers of the country, and have had an opportunity of studying the genus by the excellent herbarium of Dr. Engelmann. It is gratifying to know, therefore, that the position given to such cultivated varieties as obtain in this herbarium, agrees with that given to them by leading grape-growers—the views of the botanist and the practical man coinciding.

When we find it so difficult to properly separate the wild species, we can no longer wonder at the difference of opinion as to the nature of many

---

strongly and even fetidly-aromatic taste. No cultivated varieties of the species are known.

2. VITIS RIPARIA, *Michaux*—Mostly a smaller plant than the last, but with larger and more or less cut-lobed glabrous shining (or rarely when young, slightly downy) leaves, the lobes long and pointed; the teeth also more pointed than in *cordifolia*; berries as small, or usually larger than in the last, mostly with a bloom, in smaller bunches, mostly 1 or 2 seeded; seeds with a less prominent raphe.

This species prefers thickets or rocky soil on river banks and extends as far west and south as the last, and much farther north, being the only grape-vine in Lower Canada, where it is found even 60 miles north of Quebec. The northern form, in Canada, northern New York to Michigan and Nebraska, has fewer and larger berries in a bunch and is easily distinguished from *V. cordifolia*. The southwestern form, however, approaches more closely to this last species, with which Prof. Gray in the later editions of his Manual has united it. The fruit ripens earlier than that of *cordifolia*, and is much pleasanter. In St. Louis a variety found on the rocky river banks is brought to market in July. A number of cultivated varieties are referable to this species, among which the *Taylor Bullit*, the *Delaware* and the *Clinton*, are the most prominent.

3. VITIS ÆSTIVALIS, *Michaux*: Smaller than the first, climbing over bushes and smaller trees; leaves large, of firmer texture than the preceding ones, entire, or often more or less deeply and obtusely 3—5 lobed, with short and shallow, broad teeth; when young always very woolly, mostly bright red or rusty; at last smoothish but dull and never shining like the preceding ones; berries usually larger than in both others and, when well grown, in compact bunches, coated with a distinct bloom; seeds usually 2 or 3, with a very prominent raphe.

This is the well known *Summer grape* common throughout the middle and southern States, usually found on uplands and in dry open woods or thickets, maturing its fruit in September. It is the most variable of our grape-vines and hence has seduced superficial observers into the establishment of numerous nominal species. A form with large leaves which retain their rusty down at full maturity has often been mistaken for *Labrusca*, which does not grow in our State. Another form, more bushy than climbing, with deeply lobed rusty-downy leaves and very sweet fruit, is *Vitis Lincecumii* of the sandy soil of Louisiana and Texas. This species assumes a peculiar form approaching *V. cordifolia* through its smaller black berries without bloom and in larger bunches, when it gets into shady woods with rich soil. Another form with ashy-white, downy, scarcely lobed leaves, and fruit like the last mentioned, which grows in our bottoms, often climbing high trees, or growing over bushes on the banks of lakes, I have distinguished by the name of *cinerea*. It is not always easy to distinguish such forms from the other species and perhaps less so to unite them under the single species, *æstivalis*, unless the essential characters above enumerated be closely attended to, and the numberless gradual transitions from one form into the other be watched.

We cultivate many varieties of this valuable species, the most important of which are the *Virginia Seedling*, the *Cynthiana* and the *Herbemont*.

4. VITIS RUPESTRIS, *Scheele*: A small bushy plant, often without any tendrils, rarely somewhat climbing; leaves small (2—3 inches wide) mostly broader than long, heart-shaped, scarcely ever slightly lobed, with broad coarse teeth and usually an abruptly elongated point, glabrous, and of a rather light green color; berries middle-sized, on very small bunches; seeds mostly 3—4, obtuse, with a very delicate raphe.

This very peculiar grape-vine is found only west of the Mississippi, from the Missouri river to Texas and westward probably to New Mexico. In our State where it is called *Sand grape*, and in Arkansas, it grows on the gravelly banks and over-flowed bars of mountain streams; in Texas also, on rocky plains, whence the Latin name; it is there also known under the name of *Sugar grape*. Its luscious fruit ripens with us in August.

It is nowhere yet in cultivation but may in future prove of value.

b. Berries large, 7—9 or even 10 lines in diameter; raphe scarcely visible on the more or less deeply notched top of the seed.—These plants on well grown shoots bear a tendril opposite each leaf with only rare and irregular intermissions.

5. VITIS LABRUSCA, *Linnæus:* Plants usually not large, climbing over bushes or small trees, though occasionally reaching the tops of the highest trees, with large (4—6 inches wide) and thick, entire or sometimes deeply lobed, very slightly dentate leaves, coated when young with a thick rusty,

of our cultivated varieties; for some of them have become so modified that they furnish scarcely any indication of their parentage. If those grape-growers who take interest in such matters will send specimens of such cultivated varieties as they wish to properly classify, to Dr. Engelmann, either directly or through me, they will at least get the opinion of one who is good authority, and such action may be mutually profitable. Specimens should be sent at flowering time, and should include the whole shoot with full-sized and young leaves, blossom, and tendril; and after the fruit is ripe a bunch of the berries and seeds from the same stock should follow.

The proper classification of our different varieties is of more importance, in this connection, than would at first appear. Since the publication of some of the facts set forth in this article, a few enterprising French grape-growers, in the districts desolated by the louse, have conceived the idea of importing from this country such varieties as are most exempt from the attacks of the *Phylloxera*, and M. LeFranc, the Minister of Agriculture, has likewise expressed his intention of so doing. Already a number of varieties, and especially Cunningham, Herbemont, Norton's Virginia, Concord, Hartford Prolific, Clinton and Martha have been shipped to M. J. Leenhardt, of Montpellier, France; and others to Switzerland, by Messrs. Isidor Bush & Co. If America has given this plague to Europe, why should she not in return, furnish her with vines which are capable of resisting it? At least nothing but good can come of the trial, for though our grapes are generally sneered at on the other side of the water, we have made such rapid improvements in viticulture during the last ten years, that they scarcely know anything of our better kinds; and many of those which do well in

---

or sometimes whitish, wool or down, which in the wild plant remains on the lower side, but almost disappears in the mature leaf of some cultivated varieties; berries large, in rather small or middle-sized bunches, bearing 2 or 3 or sometimes 4 seeds.

This plant, usually known as the *Fox-grape* or *Northern Fox-grape* is a native of the eastern slope of the continent from New England to South Carolina, where it prefers wet thickets; it extends into the Alleghany mountains, and here and there even down their western declivity, but is a stranger to the Mississippi Valley. The most important varieties of this grape-vine now cultivated in our country (such as the *Catawba*, *Concord*, *Isabella*, *Hartford Prolific*, and dozens of others) are the offspring of this species; they are all easily recognized by the characters above given, and mo readily by the peculiar arrangement of the tendrils as above described.

II. Grape-vines with a firmly adhering bark, which does not scale off; tendrils almost always simple; berries very large (7—10 lines in diameter), very few in a bunch; seeds with transverse wrinkles or shallow grooves on both sides.

6. VITIS VULPINA, *Linnæus:* Bushy, or sometimes climbing high, with small (2 or at most 3 inches wide) rounded, heart-shaped, firm and glossy dark green leaves, smooth or rarely slightly hairy on the under side, with coarse, large or shallow teeth.

This southern species, known under the name of *Southern Fox-grape*, *Bullace*, or *Bullet-grape* is found along water-courses, not further north than North Carolina and Arkansas, and may possibly straggle into southeastern Missouri. Some of its cultivated varieties, especially the white *Scuppernong*, are highly esteemed in the South but do not perfect fruit in the latitude of St. Louis.

I recognize only three other species of true grape-vines in the territories of the United States. The most remarkable of these is the Mustang grape of Texas, *Vitis candicans*, Engelm. (*V. Mustangensis*, Buckley), with rather large, rounded, almost toothless, rarely deeply-lobed leaves; white woolly on the under side, bearing large berries, which in its native country are now beginning to be made into wine. *Vitis Californica*, Bentham, the only wild grape of California, has rounded downy leaves, and small berries, and is not made use of as far as known. *Vitis Arizonica*, Engelm. similar to the last, but glabrous, with middle-sized berries, reported to be of a luscious taste. Neither of these show a prominent raphe on the seed, so that this character is peculiar only to the first 3 species here enumerated.

Missouri will doubtless succeed in France. Such of our vines as have already been cultivated there are often differently classified by their writers to what they are by American authors, and confusion consequently ensues. Thus, one of my correspondents, M. Laliman, of Bordeaux, who has cultivated a number of them for several years, classes the Clinton and Taylor as *æstivalis*, and the Norton's Virginia and Delaware as *Labrusca*.*

I will now indicate the susceptibility of different varieties to the disease.

Vitis vinifera (European).—All European varieties with roots badly affected. In many instances decomposed and gone, with the vines about dead. No leaf-galls.

V. riparia (River Bank). Clinton.—Leaf-galls extremely abundant. Root-lice only moderately so. Taylor—Where leaf-galls are few, root-lice abundant; where galls are abundant, fewer root-lice. Delaware—A few leaf-galls; lice abundant on roots. Othello (hybrid with *vinifera*)—Both leaf-galls and root-lice, the latter tolerably numerous. Louisiana (some say a seedling of *vinifera*, others again believe it *æstivalis*)—Leaf-galls and root-lice, but neither bad. Alvey—Few leaf-galls; plenty of root-lice. Cornucopia (hybrid with *vinifera*)—No leaf-galls; roots badly affected with lice. Wild vine—Numerous leaf-galls and a few root-lice; much in same condition as Clinton.

V. æstivalis (Summer). Cunningham—No leaf-galls, but a few root-lice. Cynthiana—Occasionally a few galls; lice abundant on roots. The vine has a vigorous growth and the roots are large and strong. Herbemont—A few leaf-galls, and scarcely any root-lice. Norton's Virginia—No leaf-galls, but some root-lice.

V. Labrusca (Northern Fox). Isabella, or seedlings of Isabella—No leaf-galls; a few root-lice: roots strong and vines flourishing. Martha—No leaf-galls; very few root-lice. Hartford—No leaf-galls; very few root-lice. Concord—No leaf-galls; scarcely any root-lice. Almost entirely exempt. Ives—No leaf-galls; lice tolerably abundant on roots. North Carolina—No leaf-galls; very few root-lice. Maxatawney—No leaf-galls; root-lice quite abundant. Creveling—A few leaf-galls; root-lice abundant. Catawba—No leaf-galls; root-lice very numerous, abounding even on the larger roots as on the European vines. Gœthe (hybrid with *vinifera*)—No leaf-galls, but lice on roots very numerous. In the vineyards of Messrs. Isidor Bush & Sons, of Bushburg, Mo., this vine was very vigorous and thrifty in 1869 and 1870, but has done poorly the present year. Dracut Amber—No leaf-galls; few root-lice. Wilder (hybrid with *vinifera*)—No leaf-galls; not many root-lice. Challenge (hybrid with *vinifera*—No leaf-galls; roots affected but moderately. Diana—No leaf-galls, but plenty of root-lice.

V. vulpina (Southern Fox or Muscadine)—As it is not grown in this locality, being considered absolutely worthless here, I know little about it.

From this experience it would appear that no vines of those named, are entirely free from the attacks of the root-louse; but that the European varieties are most susceptible to it—the Northern Fox, next in order, the

* Etude sur les divers Phylloxera, et leur médications.

River Bank grape next, and the Summer grape the least affected. It would likewise appear that galls are occasionally found on all of the species except the European, and as they have in a few instances, been found on this species in Europe, it cannot be considered entirely exempt.* Nevertheless, in general terms, the River Bank grape must be considered the species which the gall-louse prefers. Experience on this point will, no doubt, vary in different parts of the country, and more extended experience may modify some of these deductions.

We thus see that no vine, whether native or foreign, is exempt from the attacks of the root-louse. Yet, on the principle that a small dose of poison may prove harmless or even beneficial where an over-dose will kill, we find that a small number of root-lice produce no serious effects upon the vine; and that it is only where they are very numerous, and cause not only the fibrous roots, but even the larger ones to waste away, that their evil effects are perceptible. With most of our native vines when the conditions are normal, the disease seems to remain in the former mild state, and it is only with the foreign kinds, and with a few of the natives, under certain conditions, that it takes on the more acute form.

In France, according to M. Laliman, the American varieties which have resisted the root-louse best are the Clinton, Taylor, Herbemont (known there as Warren), and some others which are considered valueless here, such as Pauline, Elsimboro, Lenoir, Mustang of Texas, and a kind of York-Madeira; while those which succomb are Isabella, Scuppernong, Concord, Norton's Virginia, Maxatawny, Hartford Prolific, Cynthiana, etc. This experience differs a little from ours, but shows that the *Labruscas* suffer most there also.

MEANS OF CONTAGION FROM ONE VINE TO ANOTHER.

The young lice, whether hatched upon the roots or in the galls, are quite active and crawl about for some time; and that they will spread from one vine to another, either under ground upon the roots or on the surface of the ground during the night, is highly probable. Such, however, cannot be the mode of spreading from one vineyard to another; for were it so, the malady could not possibly have assumed such proportions in so short a time, as it has done abroad. One method of transport is upon the roots of seedlings and cuttings, but the insect cannot in this manner find its way to an old vineyard, and there must be still another means. Here we come to that part of the natural history of our louse which must assume the form of hypothesis until further observations shall be made. In this country the malady is general, but in France, where it is still spreading from one place to another, they have a good opportunity to watch its progress; and Planchon finds that it always commences at certain circumscribed points and spreads from these points in more or less regular circles. There is no way of accounting for these nuclei—these starting points in the center of an old vine-

*Since this was written I have been informed by Mr. Glover, of the Department of Agriculture, that the leaves of certain European vines, in green-house, such as *Muscat Hamburg* and *Madam Pince* were crowded with the galls, even as late as December; and that they had begun to spread on to *Sonora* and the *Duc de Malacoff*.

yard that never showed signs of the disease before, except on the hypothesis of the winged insect having flown there and started the colony.

We have already seen that certain individuals of the root-inhabiting type become winged. Why these individuals become winged while others never do, is, perhaps, not for us to understand. Signoret ventures the Lamarckian suggestion that the need of quitting roots that are already destroyed may be one reason, and the pupæ are certainly found more particularly on badly infested roots. All plant-lice multiply agamically during the summer months while they are abundantly nourished, but towards winter when, by this mode of reproduction, and by the diminishing nutriment in the dying foliage, the lice become, so to speak, exhausted, then lo and behold winged males and females appear! Numerous other facts in insect life, such as the production of drone bees solely from unfertilized eggs, etc., indicate that the winged male may be, in some way or other, connected with defective vitality; and Mr. Thomas Meehan, of the *Gardeners' Monthly*, has so frequently observed such to be the case with plants, that he considers it a law "that with a weakened vitality comes an increased power to bear male flowers."* But this throws no light on the production of winged females, and here, as in thousands of other instances, nature tells us plainly to be satisfied with the facts without the explanation.

Our winged female is a reality! What, then, are her functions? In the breeding jars she invariably flies towards the greatest light, and her large compound eyes, and ample wings indicate that she was made for the light and the air. We have also seen that she is burdened with two or three eggs only, and my opinion is that after meeting her mate, her sole life duty is to fly off and consign her few eggs to some grape-vine or grape-bud, and that the lice hatching from these eggs constitute the first gall-producing mothers.

I am led to this opinion by the fact that about the middle of May, in looking for the galls, I always find but two or three to a vine, and generally but one to a leaf. These vernal galls—as one would expect from the greater vitality of the young from fertilized eggs, and the greater succulency of the leaves at that season—are much larger than the ordinary summer form, and generally have a decidedly rosy tint on one side. Similar galls have also been found in France. Just as many other insects prefer certain species of plants, or even certain varieties of a species, so our winged *Phylloxera* shows her preference for the Clinton and its close allies. She occasionally deposits her eggs on other varieties, as I have found the large vernal galls on Concord, Hartford Prolific, etc., and it follows that she must do so where no *riparia* vines occur. But, except on the varieties of the latter species, the young lice hatching from her eggs do not seem to be capable of forming galls, on the leaves, but make straightway for the roots. Only in this manner can we account for the galls abounding so much more on some varieties than on others.

Some persons may wonder how a minute insect with such delicate wings, braced with so few simple veins, as those possessed by our *Phylloxera*

*Proc. Am. Ass. Adv. Sci., 1869, p. 256.

can manage to fly through the air to any great distance; and those who have not witnessed them in flight are very apt to underrate their power of volitation. There is a conical gall very common on the upper surface of the leaves of our Shell-bark hickories. This gall is made by a louse very closely allied to our Grape-leaf gall-louse and was named *Phylloxera caryæfoliæ* by Dr. Fitch.* This louse occurs abundantly in the winged form, and furnishes an excellent illustration of the power of the insects of this genus to fly. Let any one watch these winged gall-lice, as they issue, during some warm day in June, from the fimbriated mouth of their gall, and he will be struck with astonishment at the facility and power with which they fly off. They are no sooner out of the gall than the wings commence to vibrate so as to become invisible, and the insect suddenly darts away with wonderful force. They must likewise, often be carried great distances by the wind.

Again, it would at first sight seem almost impossible for the female to deposit her loose eggs which have no viscous property, upon a swaying leaf; but this very feat is accomplished by another little louse of the same genus,† which may be found depositing its eggs all through the summer months, on the under side of the leaves of our young Post oaks.

PROBABLE REASON WHY ITS INJURIES ARE GREATER IN EUROPE THAN WITH US.

It is a well recognized fact among careful observers, that in the natural state there is greater harmony between the fauna and flora of a country than in the more artificial state that civilized man induces by cultivation. Through a long series of ages, the species least able to contend in the struggle for life, "go to the wall," until at last, by a process of elimination, the balance is struck and we find the animal and plant world well adapted and adjusted to each other. For this reason the native vines which now flourish in this country are those which have fought the long battle in the past and have best resisted the enemy. They are, in short, best adapted to the circumstances, and by their more vigorous nature resist the hypertrophy of the bark caused by the punctures of the lice, and form new bark under it. The European vines, on the contrary, are not only of a more highly improved and tender character, but have not been accustomed to the disease. They consequently succumb more readily, on the same principle that many diseases that are comparatively harmless among civilized nations, acquire greater virulency and play fearful havoc when introduced among savage, or hitherto uncontaminated peoples.

There may be other reasons, such as the different modes of culture and difference of soil; for in the French districts so badly affected the vines are either grown with a single stake or no stake at all, and their soil is generally much poorer than ours. In America, also, we know that there are several natural enemies of the louse, and these checks have, in all likelihood, never been imported into Europe with their prey. That the louse will in

* Rep. III. § 166.

† This is a species of *Phylloxera* which is yet undescribed, but which M. J. Lichtenstein proposes to call *Ph. Rileyi*. It infests the leaves of our Post oak very much in the same manner as the European *Ph. quercus* infests their oaks—causing a similarly pale speckled appearance of the upper side of the leaves. It differs from all described species in the great length and prominence of the tubercles.

time find enemies, and lose its acute power of doing harm even in Europe, is highly probable; and M. Planchon has already noticed that the infested vines in the later invaded departments of Gard and Herault retained a comparatively greener color than in that of Vaucluse, first invaded. Such has been the history of the Hessian fly and a number of other insects imported into this country. These are the explanations I venture, and whether they be generally accepted or not, the facts remain.

OUTWARD AND MORE VISIBLE EFFECTS OF THE ROOT DISEASE.

As long as the lice are confined to the more fibrous roots which, in a measure, are renewed each year, the vines show no decided outward signs of the malady, which may then be considered in its incipient stage. As they become multiplied and fasten on to the larger roots, their work becomes more visible in a sickly, yellowish appearance of the leaf; and a reduced growth of the vine is the result. As the roots waste away these symptoms become more acute, and at this stage of the disease the lice have generally left, so that when the vine is about dying it is often difficult to find any trace of the cause of death. On the rotten roots little eight-legged mites are frequently met with, and they are also to be found in the galls. They may always be distinguished from the true lice by their white, or dirty-white, color.

PRACTICAL SUGGESTIONS.

Last year, from the knowledge we then had of this insect in this country, I recommended the destruction of the Clinton vine, where other and better varieties succeeded as well. This advice was given in order to get rid of the galls, and wherever it has been followed it has had the desired effect. It was given, however, under the impression that the lice would not attack the roots except where the leaves were covered with galls; whereas, in truth, the roots would appear to be less affected (at least during the growing season) where the leaf-galls are abundant than where they are scarce; while they may be absolutely ruined where no signs of galls exist. Consequently there is no longer any urgent need of, or good reasons for, destroying our Clinton vines. By doing so we may diminish the number of galls, but we can never exterminate the root-lice. Future experiments will no doubt show that good results will attend the grafting of such varieties as are known to be most seriously affected, on to the roots of less susceptible varieties.

The insect should be especially watched, as it is apt to be most troublesome, on poor, gravelly or clayey soils. In deep, rich soils I think there is less danger. In France it has been found to be less troublesome on sandy soils, and in my studies I have always noticed that minute, soft-bodied insects do poorly in sand.* The greater the growth of vine the greater the growth of root, and consequently, vines that are trained on walls and which thus more nearly approach the wild state, or which are rendered vigorous by a rich soil, are least susceptible to the disease.

* In examining vine roots this fall in some parts of Northern Illinois, where sand formed a prominent portion of the soil, I found very few root-lice, except on *Cordifolia* vines whose leaves had been covered with galls. Even on these the general healthfulness of the roots, indicated that they had not been infested during the summer, and that the lice had all come from the last galls of the season.

REMEDIES.

DESTRUCTION OF THE GALL-LICE.—From what we have already seen, we may justly infer that this insect cannot of itself spread from one vineyard to another without going through the gall-producing phase; and a few galls on the leaves are, no doubt, invariably the first signs of its advent, by natural means, into a vineyard not previously attacked. By natural means, I mean without the aid of man's assistance, by which they are introduced from one place to another on the roots. If these galls, therefore, could only be found and destroyed, it would be one way of effectually heading off the evil; and in a new vineyard a little vigilance in searching for these galls might save much subsequent loss and labor. I shall not treat here of the natural enemies of the louse, which are of such a nature that they cannot be practically controlled and increased.

DESTRUCTION OF THE ROOT-LICE.—I hope next spring to institute a series of experiments on the root-lice, with a view to the discovery of a practical remedy. It were to be desired that others having opportunity and occasion would do likewise. Here is an excellent chance for our different agricultural colleges, which have greater means and facilities than any one individual can possibly have. As a guide to such experiments, and to profit as much as possible by the experience of others, I will synopsize the results of trials in France. From these results, which I give below, we may learn that no reliable and cheap remedy, that will destroy all the lice after they have become numerous, has yet been discovered; and the best advice that can at present be given is to guard against the insect's introduction into new vineyards by carefully examining the roots before planting. If knots and lice are found upon them, the latter may be destroyed by the same means used against the Apple root-lice—*i. e.*, by immersing the roots in hot soap-suds or tobacco-water.

Preparations of carbolic acid have, so far, given most satisfaction, and I have great hopes of benefit from the saponaceous compound prepared in this country by James Buchan & Co., of New York. This compound is not yet manufactured in France, where they have to use the pure acid or the crystals.

Carbolic acid added to water at the rate of one-half to one per cent, has been successfully employed, and M. Leenhardt, of Sorgues, has by its use, succeeded in keeping his vineyard alive and bearing, while all those around him are destroyed. He uses a heavy bar, thickened and pointed at the end, wherewith to make two or three holes, a foot or more deep, around the base of each vine. He then fills these holes with the liquid, which gradually permeates the soil in all directions. A good post-hole augur, such as we use in this country, would work more rapidly, with the advantage of compressing the earth less, but it would do more injury to the roots.

Oid of cade.—This empyreumatical oil, which is common and cheap in France, when dissolved in any alkali (the urine of cows being good enough)

and applied in the same manner described above, has also given good results. A mixture composed of lime and sulphur boiled in water at the rate of about five pounds lime and five pounds sulphur to one gallon of water, and applied when hot, has been found good.

Alkalies seem to invigorate the vines, but do not affect the lice. They are also too costly. *Salt.*—Vines on lands strongly impregnated with salt have been found to resist the attacks of the lice. *Acids* generally are neutralized by the lime which most soils contain.

Sulphur has been thoroughly tried without any good results, either upon the leaf-lice or root-lice.

Sulphuretted hydrogen.—They have tried to pump this into the soil, but the pumps always break, and no one would think of going to such trouble here.

Sulphate of iron is of no account. *Sulphate of copper* destroys the roots. Numerous other chemicals have been experimented with, but with very little or no success, and they are besides not applicable on a large scale.

Irrigation and submersion have been pretty thoroughly tested, and it is doubtful, even where they can be employed, whether they have any other effect than that of invigorating the vines, as the lice are, many of them, still found alive after a submergence of months. These methods must be considered conservatives rather than curatives.

RESUME OF THE INSECT'S HISTORY.

We have had in this country, from time immemorial, an insect attacking our native vines, either forming galls on the leaves or gall-like excrescences on the roots.* This insect is polymorphic, as many others of its Family are known to be. It also exists in two types, the one, which may be termed *radicicola*, living on the roots, while the other, which may be termed *gallæcola*, dwells in galls on the leaves. The latter is found more especially on the Clinton and its allies, while the former is found on all varieties, but flourishes best on vines belonging to the *vinifera* species. The gall-inhabiting type was noticed and imperfectly described in 1856, but the root-inhabiting type, being less conspicuous, was unknown in this country till last year.

Such an insect is very readily transported from one country to another on grape roots, seedlings, etc., and just as our Apple root-louse (*Eriosoma lanigera*, Hausm.) was imported into Europe towards the close of the last century, so we find that our Grape-louse was similarly imported, in all probability within the last decade. The mode of transport will become all the more intelligible when I state that M. Signoret showed me, last July, the yet living progeny of some lice which he had placed in a tightly-corked glass tube the year before; and that he had managed to keep a few alive for study all through the siege of Paris up to the time mentioned.

Nothing would be more natural than its introduction at Bordeaux,

* I have been able to trace them with absolute certainty as far back as 1845, for in the herbarium of Dr. Engelmann is a specimen of wild *riparia* gathered in this State in that year, the leaves of which are disfigured by the very same gall.

where M. Laliman has, for a number of years, been assiduous in the cultivation and trial of our different American vines. Or it might have been introduced at the nurseries of the Audebert Bros., near Tarascon,* where all sorts of American plants have been cultivated; and, if I mistake not, M. Planchon, with commendable zeal, has so thoroughly sifted the history of the subject in France that he can trace the first invasion, with tolerable certainty, to a point near this place, Tarascon. It doubtless existed in France a few years before its injuries attracted attention, and the first notice of its work was made in the vineyard of M. de Penarvan, at Ville-neuve-les-Avignon, in 1863. The scourge soon increased and spread, and in 1868 and 1869 acquired such dimensions as to thoroughly alarm the great grape-growing districts of beautiful France. At first all sorts of hypotheses were put forth as to its cause. Some book-worms even thought they had found in this root-louse the *Phtheir* of the ancient Greeks, but the intelligent labors of M. Planchon soon dispelled all such illusions, and proved that the *Phtheir* of the ancients was a true bark-louse (*Dactylopius longispinus*, Targ.) of a totally different nature, and still existing in the Crimea.†

In this manner our root-louse was known and studied in a foreign land before its presence was even suspected in this—its native country.

CONCLUSION—NO NEED OF UNNECESSARY ALARM.

Knowledge of the facts I have here brought forth need not alarm the grape-grower any more than correct knowledge of some indisposition, hitherto incomprehensive and consequently uncured, should alarm the human patient. It was only a few years ago that our eyes were opened to the true character of the entozoa known as *Trichina spiralis*, and there can be little doubt but that previous to our knowledge of this parasite many a death occasioned by it was attributed to other unknown causes. It may not be more easy to cure the disease now than it was formerly, but we are, by understanding its nature, enabled to easily guard against and prevent it. "Full knowledge of the truth," says Helmholz, "always brings with it the cure for the damage which imperfect knowledge may occasion." The *Phylloxera* has always existed on our vines, and those varieties which in the past have best withstood its attacks will be very likely to do so in the future. The presence of a few lice on such varieties need cause no fear, for the idea of ever entirely exterminating such an insect from the country must be perfectly utopian, and all we can do is to watch and more particularly care for those varieties that most easily succumb. In the future, the vineyardist will be enabled, by the revelations here made, to trace to a definite cause many a failure which has hitherto been wrapped in conjecture and mystery.

In thus calling the attention of the grape growing community to this interesting little insect, which is sapping the roots of their vines, my inten-

* M. Laliman in the essay already mentioned (p. 63), shows that this nursery has not existed for nearly fifteen years; but this fact does not preclude the possibility of the louse having been first introduced there. It would only indicate—if the spread of the disease can be traced from that point—that it existed in France, without attracting attention, at an earlier epoch than is generally supposed.

† See an Essay entitled La Phthiriose on Pédiculaire de la Vigne ches les Anciens. Bulletin de la Soc. des Agr. de France, July, 1870.

tion is to do good and not cause unnecessary consternation. Let me hope that others may be induced to study the microscopic plague and thus not only assist to fill the gaps yet occurring in its natural history, but help us to become better masters of it. Only those who have witnessed the fearful havoc it has made abroad—where in three years it caused a loss of 25,000,000 francs in the single department of Vaucluse, France,—can fully appreciate its importance and its power, under favorable circumstances, to do harm.

I must remind those who live outside of Missouri, that my observations in this country have been confined to different parts of this State, and apply more especially to this portion of the Mississippi Valley. The insect occurs, however, very generally over the country east of the Mississippi river, even into Canada; and there are strong indications that it produces similarly injurious effects elsewhere. To give a single example: According to the records, most of the vineyards on Staten Island which were flourishing in 1861, and which were composed principally of Catawba, had failed in 1866, and Mr. G. E. Meissner, of Bushberg, who then owned a vineyard on that island, informs me that he had noticed the nodosities, and that the roots of the dying vines had wasted away.* I cannot conclude without publicly expressing my indebtedness to Messrs. Lichtenstein and Planchon, of Montpellier, France, for the cordial and generous manner in which they gave me every facility for studying the insect there, and witnessing experiments in the field.

* Since the above was written, I have listened to an essay on Grapes, by Mr. P. Manny, of Freeport, Stephenson county, Illinois. In this essay, which was read before the Illinois State Horticultural Society, the writer states that his Delaware, Iona and Salem vines lose their lower roots. He attributes this loss of roots to the tenacity of the soil (though more likely owing to unseen root-lice), and has remedied it in a measure by grafting on Clinton roots.

BENEFICIAL INSECTS.

SILKWORMS.

"Si Patriæ utilis compensatus est labor."

INTRODUCTORY.

Silk is at once the strongest and most tenacious of fibres, and makes the most beautiful, durable and valuable of tissues. What gold is to metals, or the diamond to precious stones, that silk is to all other textile fibers.

Upwards of 35 years ago speculators succeeded in creating an immense furore throughout this country on the subject of silk-culture. It is not my purpose to repeat the history of the silk excitement, which by the name of the *Morus multicaulis* fever stands out prominently as an integral part of the history of our Republic. Inflated to its utmost the bubble soon burst, and with its collapse came a reaction which has ever since prejudiced Americans against an industry which is justly considered one of the very richest with many nations of the earth. As a people we are too apt to go to extremes, and the history of the White Willow hedge fever in the West, some ten years ago, and of other similar speculations which have for a while excited the people's mind, is present to tell us that the *Morus multicaulis* fever does not stand alone as an evidence of the fact.

Strong as was the reaction and the prejudice against silk-culture, yet during the last few years the subject has received increasing attention, and Commissioner Capron refers hopefully to it in his last report from the Department of Agriculture.* It has been shown that some races of the worm will feed and flourish on Osage orange, and that some parts of this great country are, so far as climate is concerned, eminently adapted to the rearing of this precious insect, whose industry increases that of man. Indeed, so much of an exaggerated nature has been said and written on the subject, since the close of the Rebellion, and more particularly in California, that there is some danger of a repetition of the history of 35 years ago.

It has occurred to me that an accurate account of the Mulberry Silkworm, and of such other introduced or indigenous species as seem to warrant it, may, in great measure, prevent any such unfortunate recurrence, and really prove interesting and valuable to the people of Missouri as not only revealing the habits of some of the most splendid moths which enrich

* 1870, p. 8.

our fauna and constantly attract the attention of the knowledge-seeker; but as giving information which may at any future day become invaluable in an industrial sense.

Though we may not, at present, be able to compete, in their own markets, with the cheaper labor of parts of Europe and Asia, there is no reason why, with proper intelligence, we may not produce our own silk as cheaply as it can be brought here from those countries; and I am convinced that should we ever be cut off by war, from those countries on which we rely for our present silk supply, we can easily fall back on our own resources; and there are few parts of the United States better adapted to the raising of silk than the southern counties of Missouri. Even now, there is no reason why the young people, and those unable to do harder work, in thousands of families, in that section of the State more especially, should not spend a few weeks each year in the pleasant work of producing cocoons. The spinning wheel and the distaff have been superceded and driven from the household by modern machinery; and the time which used to be given to their working in former days, might be profitably devoted now-a-days to silk-raising and reeling. Such a substitution of the finer for the coarser fiber would indeed be typical of our modern civilization and progress compared with the old.

Not very many years have elapsed since grape-culture was considered impracticable in this country, while the practicability of pisciculture is only just now beginning to be realized; and to one who is familiar with the details of sericulture abroad, it becomes very clear that, with the endless variety of our soil and climate, the production of silk might soon be added to our constantly increasing resources—especially if fostered and encouraged at the start by wise government. It is not always wise to prophecy, and yet, to me, the day is not far distant when there will be on our Pacific coast silk-reeling establishments, worked it may be by the most skilled Japanese labor—establishments which will create a ready market for cocoons reared with us, even if we do not erect *filatures* or reeling establishments ourselves; for the completion of the Union Pacific railroad brings us into direct communication with the far West, and an import duty of about 10 per cent. on raw silk, though it would of course be protested against by the manufacturers, would give stimulus to this production and certainly benefit the country.

Nothing in that well known "Boy's own Book" had half the interest for me, in childhood, as the chapter on the Silkworm. The feeding of the worms was the pet summer occupation of my boyhood; while the risks ventured and obstacles surmounted to procure mulberry leaves for the same purpose, are prominent among the reminiscences of after college life. Since then I have lost no opportunity to inform myself of the details of the silk industry, so that I speak from no little experience.

Before proceeding to the more specific consideration of these silkworms, I may as well state that my object is not so much to go into detail, since whole volumes might be, and have been, written on the Mulberry Silkworm alone. My purpose is to lay before the people of Missouri such ex-

perience as is yet unrecorded, and to sift from the mass of unimportant facts, the more salient and valuable ones.

Of the eight species which will be treated of, four, namely, *mori, cynthia, yama-mai,* and *Pernyi,* are of foreign origin, and the other four, namely, *Cecropia, Promethea, Luna,* and *Polyphemus,* are native. I shall give an account of the changes these different worms undergo, because these changes have not before received sufficient attention. It will be noticed that, when newly hatched, all of them, even to the mulberry species, are, in form and structure, exactly alike; and that they differentiate more and more as they increase in size, until each acquires its specific characters. This is in accordance with a law which has only lately been fully appreciated, and which prevails throughout nature; namely, that in the early stages, the species of a genus or of a Family closely resemble each other, no matter how dissimilar they afterwards become. To the Darwinian such facts are significant, as implying descent from a common ancestry.

All these silkworms cast their skin four times during the feeding period, and thus have five different stages of growth; the worm resting and fasting from one to three days, then gradually working off the old skin, and afterwards knocking off the head.

The males of all generally issue from the cocoons before the females. This is no doubt due to the fact that the females are generally the largest, have the most vitality, and consequently require a greater time to feed, and to assimilate the food; for it has often been noticed that a small female will develop faster and consequently issue sooner than a large male.

The males generally have much broader antennæ than the females; but in *Promethea* the difference is not great, and in *cynthia* it is often imperceptible.

They all, when in the cocoon, are furnished with an acrid or Bombycic fluid, with which they weaken the resisting force of their cocoons, and facilitate the exit of the moth; though those which make rounded or closed cocoons are much more amply supplied than those which form pointed or open ones.

All the cocoons, whether pointed or rounded, are spun in one continuous thread. In issuing, the moths of all of them rupture, more or less, the threads of the cocoon, thus rendering it valueless for reeling. Many writers assert to the contrary; but I have examined no deserted cocoon which has not shown some broken threads, and have witnessed the threads break during the emergence of the moth. Such as are naturally open are broken less than the others; but if only a half dozen threads are sundered, the cocoon is spoiled for reeling purposes. All the native cocoons are at times found drilled with large holes, and gutted by birds or squirrels; and those which fall to the ground are frequently destroyed by mice, rats and moles.

All the moths are night flyers. All the large heavy worms, when full grown and in a state of nature, hang on the under side of leaves and twigs, being too heavy to sustain themselves in an upright position. They are all of some shade of green—no matter what their color when younger—and in a

measure similate the leaves of their food-tree, so as to render detection difficult.

They all, whether native or foreign, need fresh air for their well-being; confinement in rooms and in large numbers together undoubtedly predisposing to disease. In breeding insects entomologists well know that those species even which best bear confinement, rapidly degenerate in the course of a few generations, and it is a very general law with animal and plant life, that the more it approaches the artificial in contradistinction to the natural, the less vigorous in constitution it becomes.

It is a little singular that the principal trees which may be used for producing the best silk, namely, the Mulberry, Osage orange and Ailanthus, are all three of them remarkably free from the attacks of other insects.

By judicious breeding and selection I believe that the native worms may be improved in their silk-producing qualities, and that the foreign ones may be acclimatized and better adapted to our conditions.

With this brief prelude I will at once introduce—

"The worm that spins the Queen's most costly robe,"

THE MULBERRY SILKWORM—*Bombyx* [*Sericaria*] *mori*, Linn.

(Lepidoptera Bombycidæ.)

ITS PAST HISTORY.

Silk seems to have been first manufactured and used as an article of clothing in Asia. At least it was first obtained from thence by the ancients, and the Romans called it, from the name of the country whence it was supposed to be brought, Sericum. According to the best records its cultivation commenced in China under the reign of Emperor Houng Ti (Emperor of the Earth), and the Mulberry Silkworm is undoubtedly indigenous to China, where it fed naturally on their wild mulberries.

The wild worm has yet to be discovered, however, and will doubtless be found eventually in some of the provinces of China. A wild variety, of small size, living on Mulberry, is said to occur in Java, but it is difficult to say whether it is there indigenous and has always been wild, or whether it has sprung from escaped specimens of the domesticated races.*

Long before the Christian era, silk was cultivated both in China and India, where a class, whose occupation was to attend to silkworms, appears to have existed from time immemorial, being mentioned in the oldest Sanscrit Books.† Its cultivation can be traced back in China to at least 2700 B. C. From China it was exported to India, Persia, Arabia, and the whole of Asia.

*Maurice Girard. *Les Auxiliaries du ver a soie.* p. 5. 1864.

†Colebrook in *Asiatic Researches*, V. 61—quoted by Kirby & Spence.

The manner in which silk was produced long remained a mystery to the ancients, and Aristotle first rightly conjectured that it was unwound from the pupa of a caterpillar. At Rome, even as late as A. D. 280, a silk attire of purple was considered by the Emperor as a luxury too expensive for an empress—it being worth its weight in gold.

In Europe the mode of producing and manufacturing it was not made known till about the middle of the sixth century, when two monks of the order of St. Basil, arrived at the court of the Emperor Justinian, at Constantinople, from a missionary expedition to China, and brought with them the seeds of the Mulberry, and communicated the mode of rearing the worms. In Greece its culture and manufacture soon spread, and the Venetians in the hight of their prosperity carried supplies to the whole West of Europe. It was introduced in time into Spain, Portugal and Sicily, and in 1540 extended to Piedmont, and throughout Italy. Here the product soon outranked in excellence the very best of Asiatic origin. In France we hear of mulberry trees being planted near Avignon as far back as 1340. Later, namely, in 1494, silk-culture was introduced into Alan; but it did not become thoroughly established till 1603, when encouraged by Henry IV. It has now become one of the most important industries of that country. In 1865 the value of silk goods produced was estimated at $106,500,000, of which $26,500,000 (raw material) was imported. The home consumption was $35,000,000, and the export $71,500,000. The number of silk looms employed in the empire was about 225,000, and gave bread to half a million of the inhabitants. The United States paid France in 1865, $9,900,000 for her silk goods. During and since the war we have been more economical. About the year 1605, James I, who, while king of Scotland, was forced to beg of the Earl of Mar the loan of a pair of silk stockings to appear in before the English ambassador, endeavored to encourage its culture in England; but the climate is not favorable to the rearing of the worm, and yet the English annually import millions of dollars' worth of raw silk, and only recently a "Silk Supply Association" has there been formed, which now publishes a monthly journal, and the objects of which are thus stated:

1. To stimulate the production of silk, by cottage cultivation and otherwise, in every county where the mulberry tree is capable of giving food to the silkworm. 2. To encourage the introduction and exchange of the best kinds of silkworms in silk-producing districts. 3. To offer practical suggestions and encouragement to the producers of silk for improving the quality and securing a better classification, and for ensuring greater care in the reeling of the silk. 4. To promote the cultivation of silk in the various silk-producing districts in India, where the production of silk has not recently increased, and in other districts of India, where the cultivation of the silkworm has almost ceased, but which are known to possess special advantages, by the growth of the mulberry tree and the habits of the people, for its propagation. 5. To promote the exportation of cocoons from countries not well able to reel them. 6. To communicate with the Foreign, Colonial and Indian Departments of her Majesty's Government, and to obtain the aid of the English representatives in the British colonies and consular agents in all foreign countries to promote and extend the cultivation of silk.

There are but four countries which export raw silk; namely, China, Japan, Italy and France. Estimates gleaned from recent statistics bring the different countries in the following order in regard to their production of this export. At the head is China, which produces every year silk to the value of nearly $100,000,000; then Italy, $42,000,000; France, $26,000,000; India, $24,000,000; Japan, $17,000,000; Turkey and Asia Minor, $12,000,000; Persia, $5,000,000; Spain and Portugal, $3,000,000; Syria and Austria, each, $2,000,000; Greece, $1,000,000. Then follow other countries, averaging from $900,000 to $100,000, while the United States at present produces scarcely any—the product for ten years being, according to the last census, 3,945 pounds; of which California produced 3,587; Pennsylvania, 1; Virginia, 15; North Carolina, 95; Georgia, 14; Mississippi, 31; Louisiana, 1; Tennessee, 153; Kentucky, 45; and Missouri, 3.

An interesting proof of the gradual spread of silk over the globe is furnished by the similarity of name given to it by different nations as follows: China, *se;* Mongolia, *sirkeh;* Corea, *sic;* Arabia, *serik;* Greece, *σηρικόν;* Roman, *sericum;* Mediæval Latin, *seda;* Italy, *seta;* France, *soie, satin;* German, *seide;* Denmark, *silcke;* Sweden, *silke;* Anglo-Saxon, *siolk;* England and America, *silk.*

ITS HISTORY IN AMERICA.

During the reign of James I. of England, or in the beginning of the 17th century, sericulture was first attempted in Virginia. Other efforts were subsequently made, but were very naturally abandoned for the obvious reason that the raising of tobacco, cotton and sugar were found more profitable.

Many years subsequently it began to attract renewed attention, and was gaining strength and importance when the Revolution deranged and crushed it. After the Declaration of Independence, feeble efforts were made to naturalize the worm in the more northern States; and, according to William H. Vernon, of Rhode Island,* $30,000 or $40,000 were annually realized from rearing the worms in Connecticut, at the beginning of the present century.

But from the few data which we have to guide us, we may conclude that silkworm culture, with the exception of the fitful start during the *multicaulis* fever, was very generally abandoned in the States. And indeed the climate of the New England States is by no means well adapted to the raising of the worms; and worse still, there was no market for the cocoons. But the conditions have materially changed within the past decade. Under the stimulus of the duties on the manufactured goods, the growth of silk-manufacture has been unprecedently rapid; for there is no duty on the raw material, and the completion of the Union Pacific railroad has enabled its rapid and direct importation from China and Japan.

The Oneida Community, of Oneida Co., N. Y., have been far more successful as manufacturers than as raisers. They turn their attention to the

* Methodical Treatise on the Cultivation of the Mulberry Tree; on the Raising of Silkworms, etc. From the French of M. De la Brousse. Boston, 1828.

manufacture of sewing silk of different grades, and though the first silk was made in 1866, they realized the very next year the sum of $25,000, and at present their business has so increased that they employ about 150 female operators in their factories.

Half a dozen years ago, within a radius of fifty miles of New York, there were not 50 looms running on broad silks and serges, where now there are nearer 500. In and around Boston there are nearly as many; and Philadelphia boasts of about 30. Last fall I visited Paterson, N. J., and spent some time in the surrounding country for the purpose of inquiring into this new industry. From Mr. Thos. N. Dale, of the Dale Manufacturing Co., I learned that in Paterson alone there are some 30 establishments manufacturing silk, employing about six hundred persons, and making nearly all kinds of goods. Of ribbon factories, the largest in the United States are there, two of them employing from three to four hundred hands, though the leading specialty is silk dress goods, chiefly blacks. A large business is also done in pongee silks, or handkerchiefs, which are sold plain to New York merchants, by whom they are sent to various print works on Staten Island for a finish.

The establishment of the Dale Manufacturing Company, which is the largest, produces braids, cords, dress trimmings, etc., in great variety. This concern, like others, does a heavy business in manufacturing trams and organzines (warp and filling) for silk establishments throughout the country. Another factory employs numerous hands exclusively on ladies' trimmings, gimps and fringes. Several others are making sewing silk, hat bands, etc.

Mr. Dale uses the best European machinery, and has a seri-meter and dynamometer for testing the strength and elasticity of the thread, and scales for weighing it, all from Berthand & Cie of Lyons, France. He employs 350 hands, earning on an average from $5 to $6 a week. He uses nearly a bale (100 lbs.) of raw silk each day, for which he pays from $9 to $12 per pound.

$5,000,000 of capital are invested in the business in Connecticut, the establishment of Cheney Bros., at Hartford, being the largest in that State.

All these facts serve to show that there is at present an unlimited demand for reeled silk right at home, and I believe that reeling establishments will be built wherever sufficient cocoons are raised to warrant them.

The production of the raw material is beginning anew under far more favorable auspices than ever before, and not only in California, Arizona and New Mexico, which for this purpose are favored by heaven; but right here, in this portion of the Mississippi Valley, I believe the day will soon come when silk-raising will be carried on profitably. Any community by coöperation might add to its annual product by this industry, without in the least affecting its other industrial pursuits. Individuals have successfully raised the worms, and Mr. J. F. Wielandy informs me that his uncle, Mr. Pagan, of Highland, Illinois, raised them successfully for four consecutive years. He had some of the silk on exhibition before the Board of Trade of St. Louis; and specimens were sent to Switzerland, and pronounced, by

six different manufacturers, equal to the best grown in Europe. Some attention has been paid to the subject in Utah, and worms have been repeatedly raised, on a small scale, by myself and others in various portions of our own State. All these trials have gone to prove that the worms can be raised with us; and they have not been remunerative simply because they were carried on more for pleasure than profit, and not extensively enough to warrant the purchase or manufacture of suitable reeling machines.

SILK GROWING IN CALIFORNIA.

Through the efforts of Colonel Warren, of the *California Farmer;* the late M. L. Prevost, and others, much attention has been paid to silk-raising on the Pacific Coast since the close of our civil strife. That they have, in that section of the country, a climate most eminently adapted to the growth of the Mulberry and the rearing of the worms, admits of no doubt whatever. The extremes of heat and cold, the thunder storms and rains which often occur in France and Italy during the rearing and breeding season, *i. e.*, in May, June and July, are almost unknown in some of the California Coast Valleys.

M. L. Prevost, who by his enthusiasm earned for himself the title of "Pioneer Silk Culturist of the Pacific Coast,"* selected some 10,000 acres in San Bernardino county as a basis for a silk settlement. In a short time he managed to create a great interest in the subject, especially in Los Angelos, Santa Barbara, and San Bernardino counties. In 1867, he published the "California Silk-growers' Manual," and though he is now no more, and it is unnecessary to criticise the work as it deserves, it is important to point out a few of its inconsistencies in order to prevent others from being deceived and misled by it. It is made up principally of a series of fugitive newspaper articles brought together in an undigested form, and without regard to arrangement or chronological order. He never once mentions the race of worms he raised; asserts without proof that one man can take care of as many worms in California as can eight in France; argues without sufficient ground on a constant demand for California eggs from Europe; and asserts prematurely that California silk by the superiority of the climate is bound to be a superior article, and consequently will command the market in all parts of the world. On page 162 he speaks of the bones [!!] of the scull of the worm. On page 59 he shows that a lot of worms which he attempted to raise in Sacramento in 1866, were, from one cause or another, very badly diseased; while on page 152, in a chapter which was evidently written subsequently, he roundly asserts that he had never been able to observe any disease in California worms. On page 60 he says that a change from Mulberry to Osage leaves started the disease above mentioned, and afterwards (p. 120) clearly shows that it was started before the Osage was fed. On page 105 is given a list of prices of cocoons at Lyons, France, the average of which is $1.96 per lb.; while Ure's Dictionary gives the price of

* According to his own showing, however, (Manual p. 136,) Mr. Henry Hentsch was the first to import the eggs of the worm and the seed of the Mulberry.

cocoons in France in 1851 at about 30c., and M. Combier-Blanchon, of Livron (Drome), France, informed me last summer, that the best of cocoons only bring there about 5 francs the kilogram, which is about 50c. gold per lb. On page 77 he makes the statement that he had raised silk for two successive years at a net result of $104, and (valuing the raw silk at $4.50 per lb.) of $108 per acre. Yet on page 237 there is a calculation to show that the net return from an acre may be $2800; and by taking some of the figures given it might be made still greater.

These few inconsistencies will serve to show how unreliable the work is. M. Provost was an enthusiast, and we may admire his enthusiasm, but when enthusiasm becomes fanaticism and carries one beyond the bounds of reason, it is often productive of more harm than good. Had M. Prevost shown more moderation and reason in his writings; had he been as prone to report failure as he was to magnify success, the silk interests of California would not now be endangered by a reactive depression which is as unnatural as was the over-enthusiasm a few years since. His little work, by false showing, was better calculated to induce another *multicaulis* fever, than to healthily stimulate silk industry. Its exaggerated pictures and immoderate accounts annulled what little of value it did possess, and earned for its author the name of *blagueur,* which has been applied to him in France.

Silkworms were first hatched in California in 1860. In 1868 the interest in silk culture there was at its height, and the legislature of the State, in order to encourage the enterprise, offered liberal bounties. In 1869, the premiums amounted to $115,000; but from this time on the reaction began to take place, and the evil effects of the visionary clamor of enthusiastic advocates began to tell. The season was exceptionably unfavorable, and many of their eggs were spoiled for want of experience how best to keep them.

For a while the diseased state of the Silkworm in Europe created a large demand for foreign eggs, and the trade in the East assumed large proportions. In 1869 two millions of cards, costing on an average three dollars each, were sent to Europe from Japan, and special steamers were chartered to carry home the valuable freight. The demand was such that some eggs raised in California were also sold to France, and large profits were the result. Mr. I. N. Hoag made the following very favorable report of his business in 1868, in a letter to the *Sacramento Union*—a report well calculated to induce others to attempt to do likewise:

In 1868 I fed the leaves from three and one-half acres of land covered with two year old *Morus multicaulis* trees. The trees had been grown from cuttings where they then stood. They had been cut back in the spring or winter close to the ground and the tops used for cuttings, so that they did not furnish much over half the early foliage they would have done had they only been pruned with an eye to that purpose. The result of that operation concisely stated, is as follows: Receipts, 486 ounces and 13½ pennyweights of eggs sold to Hentsch & Berton at $4 per ounce, $1,946.70; eggs retained for self and sold to other parties, $1,897.50; perforated cocoons sold, $75.30; total, $3,919.50. Contra; labor and other expenses, $472.00. Net profits, $3,449.50. The feeding was commenced on the first of June. On

the 25th of July it was fully completed and the eggs all made. On the 7th of August I had my money from Hentsch & Berton, and could have sold the entire product to them.

But it subsequently turned out that Messrs. Hentsch and Berton lost $1,000 by the operation, and that no other such liberal men were to be found who would take such risks.

Mr. Thos. A. Garey, of Los Angelos, gave similarly encouraging results of one of his year's doings in silk-culture, having netted $2,700 from one acre, from eggs and mulberry cuttings. Many other similar cases might be given. Indeed, whenever profits were made they were not legitimately from the cocoons, which seem to have found no sale at all; but from eggs and mulberry cuttings. This was owing to the fact that no reeling establishments had been erected and there was consequently no market for the raw cocoons, while none of the raisers seem to have attempted the reeling of their own silk. But the demand for California eggs never had become an established one, and ceased entirely when the Franco-Prussian war broke out. This war had the effect to depress and almost destroy the spirit of enterprise which had prevailed a few years previous. It even left the Japanese egg trade in a bad condition, so that some lots were shipped to San Francisco at a time when the Californians had a surplus of their own. One lot of 130,000 cartoons left a record that will not encourage further consignments. In the center of the lot the heat hatched the worms, and they had to be reviewed and repacked when they arrived. After some use of the telegraph parties in New York were found who risked the shipment overland to be sent thence to Europe; but the eggs were all ruined, and every cent invested was sunk.

For these various reasons there is great despondency in silk circles in California at present, and the business has very generally been pronounced a failure. The Santa Clara *Agriculturist* says it has given less practical satisfaction and poorer grand results than almost any other industry undertaken on the Pacific coast.

At present there are lots of mulberry trees in nursery, with no demand; and the premium offered has failed of its intended object to promote the interest, because a bounty was also offered for cocoons; and there has been no effort to produce reeled silk, not a single hank having thus far resulted. There has been more speculation than work.

The whole question of the success of silk-culture in that State, and indeed in any part of the country depends, therefore, on the ability to reel the silk and thus furnish a market for the cocoons; and State aid and encouragement should be directed to this end. It always has been a serious question whether or not in producing reeled silk we can compete with the cheap labor of southern Europe and of China and Japan. If by superior intelligence and the advantage of climate the Californians can produce reeled silk —and I sincerely believe they can—so as to furnish it at home at the same rates that it can be imported from abroad, they will succeed, and silk-culture will become one of the prominent industries of the country. If they cannot, it will be a signal failure.

The manufacturing interest, encouraged as it is by import duties, will take care of itself, and silk factories are already springing up on the Pacific coast and proving remunerative, as they are on the Atlantic. Let the productive industry be similarly encouraged, and let all premiums hereafter be offered for reeled silk!

SILK CULTURE IN KANSAS—MONS. E. V. BOISSIERE'S ESTABLISHMENT.

About three years ago, Mons. E. V. Boissière, a French philanthropist, of considerable means, came to this country from Bordeaux for the express purpose of purchasing a large tract of land for general agricultural purposes, but primarily for the cultivation of mulberry trees and the raising of silk. He finally settled in Franklin county, Kansas, about 18 miles southwest of Ottawa, 10 miles west of Princeton station, on the Leavenworth, Lawrence and Galveston railroad, and three miles south of the little town of Williamsburg. Here, in 1869, he purchased 3,500 acres of undulating prairie land, and at once commenced operations by erecting a three-story frame building, 50x30 for his operatives. The land is rich and clayey, with a limestone subsoil and of good elevation. He has already fenced in 360 acres and broken about 150; and contracts are let for the fencing with stone walls of 160 acres intended for pasturage. The place has been christened "Silkville."

He does not contemplate the cultivation of this entire tract; but intends to devote the greater portion of it to the raising of cattle, for which he whishes to have sufficient range on his own land. Only the more valuable portions will be devoted to the silk interest. Already there is a good stable, a few sheds for rearing the worms, and a stone factory 83x28 for working the silk. If the silk business succeeds, the reeling of the cocoons and the manufacture of velvet trimmings will furnish occupation through the winters; but the hope of success now entertained by M. Boissière cannot be realized for at least two years, which will be required to establish the possibility of profitably raising the worms, and to await the growth of the trees. Meanwhile, to avoid any chance of failure, he intends to embark in several industries which have received no attention in that part of the country, and which will give employment to the operatives, and may be carried on entirely from the products of the farm. Of such industries, he mentions more especially broom-making; the preservation of meat in tin cans; the manufacture and refining of sorghum syrup; of castor oil; potato starch; morocco leather, and dark-headed matches, which have nothing poisonous about them and cannot be ignited except on the box containing them.

There are already planted 8000 mulberry trees which have made a wonderful growth, and there are 2,500 fine young trees in nursery to be set out. There is also a young orchard of 900 trees, and 2,000 peach trees; 1,000 Concord vines; and belts of Black locust, Black walnut and Ailanthus, will be planted the coming spring.

The forepart of last November I paid M. Boissière a visit, as I was interested in this novel enterprise just started in a neighboring State. I found him sitting at an immense table with all the operatives, partaking in common of a plain but substantial meal. He is a bachelor of some sixty years of age; a philanthropic, intelligent man—a man of plain habits, and with such broad democratic views that he originally came to this country in sheer disgust of Napoleon III. He is fully imbued with the fact that there should be no conflict between capital and labor, and intends to make the colony self-supporting; but to form eventually a co-operative society, with equitable distribution of profits, mutual guarantees, association of families, integral education and unity of interests—something after the plan proposed by Mr. E. T. Grant, in a work on Co-operation, issued from the office of the New York *Tribune*. So soon as the organization is effected he intends to donate to the association all the capital invested by himself up to that time, reserving only the right of as many votes as the capital will represent.

I found the looms in the factory idle for reasons which need not affect the ultimate success of the enterprise, and the samples of velvet ribbon and silk trimmings which had been made from French and Japanese silks, and which may be seen at Carson Bros., 121 Locust street, St. Louis, sufficiently attested the capabilities of these looms. Other looms have already been ordered from France. I shall await with much interest future developments in this colony, for upon its success very much depends. That it will succeed as a colony I have little doubt, but whether it will do so as a silk settlement, time only will tell. If it becomes a success in this last sense, it will form the nucleus of a new and important industry in the Mississippi Valley; for I cannot help thinking that there are localities innumerable, and plenty of them in our own State, where such colonies could be formed with better commercial facilities, less severe climate, and especially where there would be less annoyance from severe cold winds, which, as M. Boissière informed me, prevail there to a remarkable degree in the spring, and bid fair to form the most serious obstacle to the rearing of the worms. The State of Kansas, if it looks well to its own interests, will not let the undertaking fail for want of encouragement; for when an individual embarks in some new enterprise, the success of which is of so much importance to the State, he deserves encouragement from the Legislature, if it is necessary.

SILK GROWING IN MISSOURI.

I cannot find that the Silkworm has ever been raised in any considerable numbers in this State. I have raised them under a variety of circumstances during each of the last four years, having employed three white and yellow races from Eqin, China, received through the Department of Agriculture; and three rather inferior European varieties. They have also been raised, at my request, by several different persons near St. Louis, by Judge J. F. Wielandy of Jefferson City; Wm. R. Howard of Forsyth, and J. L. Townsend of Columbia. These trials fully warrant the assertion that

the worms can be reared here with perfect success, and that where the rules laid down under the head of "Best Methods of Rearing" are properly carried out, we may be as sure of a good harvest as they are in most of the silk-growing districts of Europe.

The worms naturally commence to hatch with us from the middle to the end of April. They commence spinning usually within thirty days, and remain in the chrysalis state just about two weeks. The feature in our climate which we have most to guard against is the excessive heat that sometimes occurs in May, when the worms are in their last stage. A wet spring with a hot early summer, is most injurious, and these features of 1870 induced a greater mortality than occurred during any of the other four years of my experience. Excessive heat, and too great richness of the food, is very apt to produce jaundice in the worms, and it manifests itself more particularly just before spinning time. Our fall season cannot be surpassed for this industry, as the weather is drier, more uniform in temperature, and the leaves are riper and sweeter than in the spring. For these reasons, future experience will doubtless prove that September and October will be propitious months for rearing the worms; and that consequently it will be best to retard the hatching of eggs by keeping them constantly at a temperature below 40° F.; or we might employ the Bivoltins—raising only enough of the first brood to give us a good supply of eggs for the second.

NATURAL HISTORY OF THE SILKWORM.

The Silkworm is interesting to us, not only from the value of its silk, but from the fact that it is about the only insect that has been under man's complete management for a long series of years, and that has been carried by him from one country to another in widely different parts of the world. It is, so to speak, the only domesticated insect to which we have been able to apply the principle of selection for any length of time; for though the Cochineal insect and the Honey-bee have been in a measure under our control, these principles have never been applied to the former, and it is only within the last few years that we have been enabled, by hive-improvements and deeper knowledge of its habits, to apply them with any degree of satisfaction to the latter. The Silkworm has been subjected to a variety of differing conditions, both of climate and management; and if species are, as many of the more advanced thinkers now contend, not immutable but mutable; we should expect to find great differences in the characteristics of this particular one. These differences we do, in fact, find; for it is notorious that there are about as many breeds of the Silkworm, as there are of the domestic Dog. In the form of the egg, the colors of the larva, and more especially in the size, color, form and quality of the cocoon; and in the varying length of time required for development; the races of *Bombyx mori* show such differences that, if found in any of our wild species, they would be considered as specific by most naturalists. Yet no naturalist pretends to give these differing races specific scientific names, though they are often designated by popular distinguishing terms.

There is one race known as *Annual* which will not produce more than one brood each year, no matter how the eggs are manipulated; another known as *Bivoltin* which produces two broods a year; and a third (*Trevoltin*), which produces three annual generations. Yet by changed conditions each of these races can, in a few years, be rendered inconstant and variable in these particular characteristics. There are races (and they are more especially adapted to warm countries) such as that of Milan, and most of the *Trevoltins*, which habitually moult but three times; and it is evident that even this important difference has been artificially produced, since ordinary worms occasionally moult but three times and the three-moulters or *races à trois mues*, as the French call them, sometimes moult four times.*

The Mulberry silkworm is, when compared to other insects, an anomaly. It had already been so long under the influence of human management ere it was introduced into Europe, that we find the larva, when full grown, possessing the white color so typical of domestication; which is the more remarkable that white is extremely rare in Lepidopterous larvæ, and unknown in any of the external feeders belonging to the Silkworm Family (*Bombycidæ*). That this lack of color is the direct result of domestication, as in so many other animals, may be very justly inferred, because when newly born the worm is almost black, and in the older worms there are constantly appearing individuals with dark or tiger-like marks which have been attributed to reversion by Captain Hutton, who, by separating and breeding from them, found that in the third generation they had become darker and that their moths were likewise darker, and resembled in coloring the wild *Huttoni* of Westwood.† We find furthermore, that it has lost all desire of escape, and the worm will seldom crawl out of the shallowest tray so long as it is supplied with food, while the moth is equally contented to remain in the same trays. So thoroughly has it lost all instinct of self preservation that, as we learn from good authority, when placed upon a tree out of doors, the worm is easily blown down by the agitation of the wind, and not unfrequently commits the blunder of severing the petiole of the leaf upon which it rests, and thus unconsciously brings itself to the ground from which it seldom has the tact or power to rise again. We find also, that the moth has lost almost all traces of color and very nearly all power of flight; its wings scarcely ever expand much beyond the length of the cocoon, from which it issues, while most of the wild silkworms, (take, for instance, the *Polyphemus*, figures 50 and 53,) expand from four to five times the length of their cocoons. The male flutters a little, but the female cannot rise off her feet, and never makes the attempt; yet there is every reason to believe that they both flow in the wild state, and it has been shown that after three generations reared in the open air, the males recover in great part the lost power.

---

* See Darwin's Animals and Plants, etc., p. 302.

† Trans. Lond. Ent. Soc. 3rd Series, Vol. 8, pp. 152, 308.

In short, the ordinary Silkworm bears unmistakable evidence of having been modified according to man's wants. He has been interested mainly in producing the largest amount of silk from the smallest amount of leaves, and we consequently find to-day vast differences in the cocoons of the different races, and great bulk of cocoon compared with the insect which makes it.

The Mulberry silkworm is anomalous in one other respect, namely, in having a curved horn on the eleventh joint; for though in those silkworms which are tubercled, there is always a large middle tubercle on the back of this eleventh joint, yet none of them possess this Sphingidous character in the same degree.*

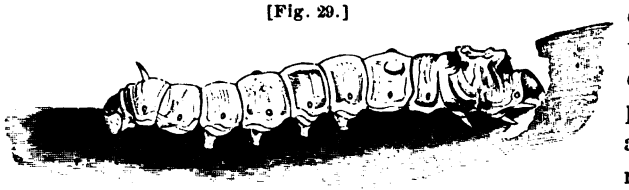
From the foregoing, it will become obvious that what follows of the natural history of the Silkworm is of the most general character.

THE EGG.—The egg is nearly round, a little flattened, and in size rather less than a mustard seed. It is yellow when first deposited, and so remains if unimpregnated,† but when impregnated soon acquires a gray or slate color and becomes indented. It is fastened by a gummy substance which the moth secretes in the act of ovipositing. Each female will lay upwards of 300 eggs. One ounce of good eggs will produce 40,000 worms. The color of the albuminous fluid in the egg corresponds, or is correlated with, that of the cocoon; so that when this fluid is white the worms produce white cocoons, and when yellow they will produce yellow ones.

As the hatching point approaches, the egg becomes more pale in color which is due to the intervening space between the rolled-up worm and the shell which is semi-transparent. Just before the worm hatches there is often heard a slight clicking noise, which, however, is common to many other insect eggs; and when loosened it will sometimes bound a short distance, evidently by the sudden jerk of the worm within, as in the case of some so-called jumping seeds and jumping galls.

THE LARVA.—The newly hatched worm, as already stated, is black or dark gray. It is covered with long stiff hairs, and if closely examined these hairs will be found to spring from pale tubercles of the same number and placed precisely in the same position as those to be found at the same age on all the other silkworms to be hereafter described. It becomes paler at each moult and after feeding for nearly a month, pre-

[Fig. 29.]



* This feature is generally considered so entirely characteristic of the larvæ of a Family of Moths popularly called Hawk-moths (*Sphingidæ*), which, for the most part, undergo their transformations nakedly underground; and so uncharacteristic of those of the large Family of Silk-moths (*Bombycidæ*), that—reasoning from analogy and forgetting his earlier experience with the Silkworm—so good an entomologist as my late friend Walsh, at first took me to task for putting a horn on the figure of this worm, which appeared on the cover of the *American Entomologist*. To me this horn exhibits merely a case of persistence of the middle tubercle on the eleventh joint, while those on the other joints have become obsolete; and we have an approach to the same condition in our *Promethea* (Fig. 43, *d*), which, as it grows, loses all its tubercles except four near the head and this one on the eleventh joint.

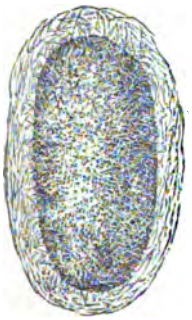
† On very rare occasions the embryo in unimpregnated eggs continues to develop and the young worm has even been known to hatch.

sents the appearance of Figure 29, having lost its long hairs, and all its tubercles but that on the eleventh joint. It does not become entirely smooth, however, as there are short hairs along the sides, and very minute ones not noticeable with the unaided eye, all over the body. The preparation for each moult requires from two to three days of fasting and rest, during which the worm attaches itself firmly by the abdominal prolegs and holds up the forepart of the body, and sometimes the tail. In front of the first joint a dark triangular spot is at this time noticeable, indicating the growth of the new head, and when the term of "sickness," as it is often called, is over, the worm casts its old integument, rests a short time to recover strength, and then freshened, supple and hungry, goes to work feeding voraciously to compensate for lost time. It is usually estimated that it consumes its own weight of leaves every day it feeds; but this is not strictly correct. It does, however, consume more during the last few days of its worm-life than during all the rest put together. When about to spin up it shrinks somewhat in size, acquires a clear translucent pinkish appearance, becomes restless, ceases to feed and throws out silken threads.

According to Quatrefages* the color of the silk is correllated with the color of the abdominal prolegs.

THE COCOON.—The cocoon (Fig. 30) consists of an outer lining of loose or floss silk, which is used for carding, and of a strong, tough pod. Its form is usually oval and its color yellowish; but in both these features it varies greatly, being either pure silvery-white, cream, or carneous, green, and even roseate; and very often constricted in the middle. The male cocoon is often more pointed than that of the female.

[Fig. 30.]



[Fig. 31.]

THE CHRYSALIS.—The worm completes its cocoon in about three days and in three days more becomes a chrysalis. In this state it remains from two to three weeks when it issues as a moth.

THE MOTH—Is of a cream-color with more or less distinct brownish markings across the wings as in Figure 31: neither sex flies, but the male is more active than the female. Coitus takes place very soon after issuing, and the female begins depositing in a day or two, whether her eggs be fertilized or not.

ENEMIES AND DISEASES.

It has generally been supposed that no true parasites attack the mulberry silkworm; and certain it is that none such are known in Europe. But in China and Japan great numbers of worms are killed by a disease called "*Uji*," which is undoubtedly produced by the larva of some parasite,

* Quoted by Darwin.

though whether Hymenopterous or Dipterous I have not been able to learn with assurance.

Several diseases of a fungoid or epizoötic nature and several maladies which have not been sufficiently characterized are, however, well known to afflict this worm. One of these diseases called *muscardine*, has been more or less destructive for many years in Europe. It is of precisely the same nature as the fungus (*Empusa muscæ*) which so frequently kills the common House-fly and sheds a halo of sporules, readily seen upon the window-pane, around its victim.

A worm about to die of this disease, becomes languid and the dorsal pulsations become insensible. It suddenly dies and in a few hours becomes stiff, rigid and discolored; and finally, in about a day, a white powder or efflorescence manifests itself, and soon entirely covers the body, developing most rapidly in a warm humid atmosphere. No outward signs indicate the first stages of the disease, and though it attacks worms of all ages, it is by far the most fatal during the fifth or last age or stage.

This disease was proved by Bassi to be due to the development of a fungus (*Botrytis Bassiana*) in the body of the worm. It is certainly infectious; the spores when they come in contact with the worm, germinating and sending forth filaments which penetrate the skin and, upon reaching the internal parts, give off minute floating corpuscles, which eventually spore in the efflorescent manner described. Yet most silkworm raisers, including such good authorities as E. F. Guérin-Méneville and Eug. Robert,* who first implicitly believed in the fungus origin of this disease; now consider that the *Botrytis* is only the ultimate symptom—the termination of it. At the same time they freely admit that the disease may be contracted by the spores of the *botrytis* coming in contact with worms predisposed, by unfavorable conditions, to their influence. Such a view implies the contradictory belief that the disease either may or may not be produced by the fungus; and those who consider that the fungus is the sole cause have certainly the advantage of consistency.

Whichever view be held, it appears very clear that no remedies are known; but that care in procuring good eggs, care in rearing the worms, good leaves, pure, even-temperatured atmosphere, and cleanliness are checks to the disease. The drawers and other objects with which diseased worms have come in contact should also be purified by fumigations of sulphuric acid, which will destroy all fungus spores.

This *muscardine*, or a disease which has not yet been distinguished from it, has also made its appearance in some of the Eastern States among silkworms, both imported and wild; and in the fall of 1870 it was so common around St. Louis, that I found hundreds of caterpillars stiffly fastened to their food plants and covered with the white efflorescence. It was especially noticeable among the "Wooly-bears," or hairy caterpillars of our different Tiger-moths (Arctians); and as the efflorescenee is not very apparent at the base of the long dense hairs, such diseased caterpillars look quite life-like.

* See their Guide à l'éleveur de vers à soie.

They die in all sorts of positions, and I have many cabinet specimens of such, cleverly prepared, stuffed and mounted by the hands of dame Nature.

Another disease, known as *pébrine*, has proved extremely fatal in Southern Europe. This is the disease referred to on page 80, which for fifteen years has almost paralyzed silk-culture in France. It is a disease which in its nature and action, except in being hereditary, bears a striking analogy to cholera among men; and its cause and origin have been the subject of almost as much speculation and study. It has been ascribed variously to the vengeance of God, to mildew or other parasitic plants upon the leaves eaten; and more especially to the artificial manner in which the worms have been raised, some authors roundly asserting that it disappears when the worms are reared in the open air, and that it is the result of a conspiracy among opticians who have purposely persuaded silk-raisers that a tempera- of 70° Fahr. (24° Cent.) is too cold for the health of the worms; when in reality they can stand with impunity a temperature of four or five degrees below freezing point.*

Theories and remedies innumerable have been proposed, and as is so often the case, those who gave the least study to the disease, were the most prolific of them.

The worms affected by *pébrine* grow unequally, become languid, lose appetite, and often manifest discolored spots on the skin. They die at all ages, but, as in *muscardine*, the mortality is greatest in the last stage. The real nature of this malady was for a long time unknown. In 1849 M. Guérin-Méneville first noticed floating corpuscles in the bodies of the diseased worms. These corpuscles were supposed by him to be endowed with independent life; but their motion was afterwards shown by Filippi to depend on what is known as the Brownian motion; and they are now known either by the name of *panhistophyton*, first given them by Lebert; or by that of *psorospermiæ*. They fill the silk canal, invade the intestines and spread throughout the tissues of the animal in all its different states; and though it was for a long time a mooted question as to whether they were the true cause or the mere concomitant—the result—of the disease; the praiseworthy and assiduous researches of Pasteur have demonstrated that *pébrine* is entirely dependent upon the presence and multiplication of these corpuscular organisms. He has so epigrammatically analyzed the malady that what was occult and uncurable before has now become clear and comprehensible; and is within man's power to stay or even eradicate.

The disease is both contagious and infectious because the corpuscles which have passed with the excreta or with other secretions of diseased worms are taken into the alimentary canal of healthy ones in devouring the soiled leaves; and because it may be inoculated by wounds inflicted by the claws. It is hereditary on the mother's side because the moth may have

* See results of rearing out of doors for four years, by M. le Dr. Jeannel, of Bordeaux—*Bulletin Mens. de la Soc. Imp. Zool. d'Acclimatation 2me Serie, Tome VI. Juillet*, 1869. A Monsieur Sintræ has also reared the worms successfully and free from disease, in the open air, in France; and Jno. S. Gallaher, Jr., of Washington, D. C., wrote to the *Rural New Yorker* in August, 1870, that he had f l the worms successfully in the open air there.

the germ of the disease and yet oviposit. Indeed, the eggs may be affected, and yet look fair and good, the microscopic *psorospermiæ* not being visible; so that the only true test of disease or health is an examination of the parent moth. Healthy moths produce healthy eggs, and here we have the key to the perfect subjugation of the disease.

Both the diseases mentioned are, therefore, in the strict sense of the word silkworm plagues. The one is of a fungus and the other of an epizoötic nature. Each may become epidemic whenever the conditions are favorable for the undue multiplication of the minute organisms which produce them; or when the checks to the increase of such organisms are removed by carelessness or ignorance. The exceptional energy which they exhibit is precisely analogous to the exceptional increase of the Army-worm, and of a number of other insects which have been mentioned in these Reports, and which at times, under favorable conditions get the mastery over their naturally appointed checks. The disease may remain indefinitely latent, until the proper conditions offer, just as seeds may, and do so remain in our forests and prairies until change of circumstance enables them to germinate and grow.

These seeds of disease which are now known to ever pervade our atmosphere play a most important part in the economy of Nature. They are omnipresent guards wisely ordained to keep order and harmony in her Domain—to insure the proper keeping of her laws, whose violation they are ever ready to punish with death—to right the wrong which man's ignorance begets—sacrificing sometimes the just with the unjust; but fulfilling God's will itself in prompting us to better and higher effort; to broader and deeper knowledge.

> "All nature is but art, unknown to thee;
> All chance, direction which thou canst not see;
> All discord, harmony not understood;
> All partial evil, universal good."

Such a view of the nature and origin of these diseases is not only far more plausible and tangible, than to believe that they are caused by some influence beyond our ken or that they originate *de novo* by some "fortuitous concourse of atoms," or by what Huxley has termed *abiogenesis;* but it is the most scientific, being based on the most elaborate experiments, and supported by experience. Pasteur has been able to prophecy with certainty, by examination of the moths, whether the progeny will be diseased or healthy, and through his efforts and the greater care that has resulted from the experience and trial of 15 years' suffering, pébrine is rapidly diminishing in France, and the harvest was better last year than it has been for a long time.

An excellent proof of this epizoötic nature of *pébrine* and of the soundness of Pasteur's deductions is furnished by the experience of Mr. L. Trouvelot in cultivating our Polyphemus worm. As I shall presently show he reared it in large quantities in 1865, and fully hoped and expected to continue his experiments. But some silkworm eggs which he imported from

abroad proved to be infected with the disease; and though upon recognizing it he immediately destroyed the larvæ, and at that time his Polyphemus eggs were not yet hatched—the precaution was of no avail, as the infection was about the house, and the native worms all eventually died of it. Speaking of this fearful disease among them, Mr. Trouvelot writes me: "A few days after the third moultings the worms begun to manifest symptoms of the deadly disease, and two or three days after, of a million, I had but a single one left, and this one even died in the pupa state. The following year, I thought I could begin anew, but I found that the epidemic had spread among the wild ones and all those I found were attacked with it, even to a distance of seven miles from my place. But the disease did not spread further as I had feared, and the third year the wild individuals were as robust as usual, but the disease, or at least the seed of it was infesting my buildings, and as soon as the healthy wild Polyphemus would approach them they became sick and died." Of late the disease has also been introduced by means of Italian eggs, into China and Japan; and while it is on the decrease in Europe, it bids fair to run a fearful course, unless prevented, in these the native countries of the silkworm:

Pébrine, as we have already seen, differs from *muscardine* in being hereditary as well as infectious. It will not suffice, therefore, simply to take the precautionary measure of purification and cleanliness advocated for the latter; we must also take care that our eggs are sound, by microscopic examination of the moths. This may be done after the eggs are laid; and if the corpuscles are found in the mother, her eggs should be discarded.

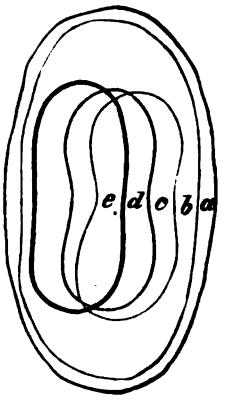
Silkworms are subject to other diseases but none of them have ever acquired the importance of those described. What is called *gattine* by older authors is but a mild phase of *pébrine*. The worms are apt to be purged by unwholesome leaves; they get sickly by too great heat; they become yellow, limp and die of a malady called *grasserie* or jaundice, which is almost sure to appear in large broods, or as the French more appropriately say, *éducations*, and which I have most frequently noticed in those reared in this country. When the worms die from being unable to moult they are called *lusettes;* and such worms are most abundant in the third age. All these different ailments and others, not mentioned, have received names; some local, others more general; but they none of them warrant further notice here, as they are not likely to become very troublesome if the proper attention and care be given to the worms.

BEST VARIETIES, OR RACES.

Since the diseases just mentioned have been so prevalent in Europe, among the French and Italian races, the Japanese annuals have been the most esteemed. The eggs are bought at Yokahoma in September, and shipped during the winter. There are two principal varieties in use; the one producing white, and the other greenish cocoons, and known respectively as the White Japanese and the Green Japanese annuals. These cocoons are by no means large, but the pods are solid and firm, and yield an abundance

of silk. They are of about a size, and both varieties are almost always constricted in the middle (Fig. 32 *c* green; *d* white). Another valuable race is the White Chinese annual (Fig. 32 *e*) which much resembles the White Japanese, but the cocoon is not so generally constricted. Previous to the prevalence of disease, a race known as the White French annual was the most esteemed, and in reality the cocoon (Fig. 32 *a*) is very large, oval, and of a pure white. The Yellow French annuals (Fig. 32 *b*) which are of a deep rich cream, or straw color outside but more yellow inside, were also esteemed, and the cocoon is large and beautiful.

[Fig. 32.]



There are local races or varieties in all the large silk-producing countries, and they generally bear the name of the locality where they are produced. The cocoons may be divided into the yellow, green and white, some races producing cocoons uniform in color; while others produce mixed cocoons. The white silk is the most valuable in commerce, but the races producing the yellow, cream-colored or flesh-colored cocoons are generally considered the most vigorous, and have certainly proved so in my experience in this country. The Annuals are more valuable than the Bivoltins or Trivoltins; though the Bivoltins are often reared, and Mr. Alfred Brewster, of San Gabriel, Cal., says that he found a green Japanese variety of these last more hardy than the Chinese Annuals.

HOW BEST TO REAR.

Volumes have been written on the rearing or *éducation* of the Silk-worm; and most persons who have had no experience with it, fancy that there must necessarily be something unusually difficult in the treatment of the worm whose marvelously lustrous product—the pride of kings and queens, and once weighed in the balance with gold—has always been associated with everything that is choice, delicate and beautiful. Yet if we travel through the different silk-producing countries at feeding or breeding time, we shall find the work very simple. From the reports on silk-culture that have lately been issued by Mr. F. O. Adams, Esq., Secretary to Her Brittanic Majesty's Legation in Japan, we may learn that the culture is carried on there in the most simple and even careless manner, with the most primitive machinery; and that the people are actually in ignorance of some of the very simplest truths, the knowledge of which would enable them to more than double their harvest. It is even worse in China; and in Southern Europe most of the silk is reared by a peasantry which knows absolutely nothing beyond plucking the leaves and feeding them to the worms; and in the best *éducations* they lose one-half the worms hatched.

There are few farm operations more simple, or which require so little training; but proper knowledge is all important to insure success and prevent undue mortality in the brood. It will be well to bear in mind the character of the climate of that part of Japan where silk-culture has at-

tained most importance—an area of about 240 square miles around Yokahoma. As I am informed by a fellow-entomologist, who has resided there for many years, and, in an official capacity, has made minute and daily meteorological observations, the winters are less severe than with us, the snow seldom remaining on the ground more than an hour: the summers are likewise less hot; but the climate during the rearing season is quite similar to that of our southern counties during the same period, though with fewer sudden changes. The mean annual temperature is 63.50 F. and the solar radiation 18.55. The wettest months are April and June, the average rain fall in April being 10.5 in May 5.1 and in June 12.4 inches. The rains stop suddenly in June, when feeding commences. The temperature of the four months of April, May, June and July averages as follows: April, maximum 70°. minimum 52°; May, maxm. 67°, minm. 56°; June, maxm. 74°, minm. 66°; July, maxm. 80°, minm. 72°. Thus their feeding months—parts of June and July—do not compare unfavorably with ours—parts of April and May.

We have already seen the importance of getting healthy eggs, free from hereditary disease, and of good and valuable races. Eggs keep best during the winter at a temperature of 40° F., and should be placed in zinc or tin boxes where no mice or other animals can reach them, and where the atmosphere is not too moist. The temperature may be decreased and may even sink below freezing point, without injury; but should never be allowed to rise above the 40°. Great care should especially be taken to prevent a too early incubation in the spring. Mulberry leaves start to grow quite late, and unless the eggs are kept back by being placed in some room or cellar that is cooler than the atmosphere, our early warm April days will cause them to hatch before there are any leaves for the young worms to feed on. The hatching may be indefinitely delayed providing the eggs are kept at a temperature below 40° F.; for in France it is often deferred by carrying eggs up in the mountains until the second crop of mulberry leaves can be used.

As soon as the mulberry leaves commence to put forth, the eggs may be brought out and they will then very soon hatch by the natural heat of the season; though if the weather be changeable, it is best to regulate the temperature by means of fires, commencing at about 75° F. and increasing it about 2° per day until it reaches 85°, when the worms will begin to hatch. By no means must the eggs be exposed to the sun's rays, which would scorch them in a very short time; and even in the shade, as the temperature is raised and the hatching period approaches, the atmosphere should be kept more and more moist, either by sprinkling the floor or by other means. The worms will thus eat through their egg shells more easily and be more fresh and vigorous.

Any room with a northeastern exposure, and which can be well and thoroughly ventilated will answer for the rearing of the worms. An open fire-place is always desirable, as in cold, damp weather, the room may be rendered comfortable and at the same time purified by the draft which the

fire creates. Buildings erected solely for feeding purposes, should combine these requisites. The feeding may be done on shelves or tables or in trays; but the wood should always be well seasoned, as green wood is injurious to the health of the little spinners, which must from now forth be well supplied with food and guarded from too much moisture or too much light.

Each day's hatching should be kept separate, in order that the worms may be of a uniform size and go through their different sicknesses with regularity and uniformity; and all eggs not hatched after the fourth day from the appearance of the first, should be thrown away as they will be apt to contain inferior, weakly or sickly worms. It is calculated that one ounce of eggs of a good race, will produce 100 lbs. of cocoons; while for every additional ounce the per centage is reduced, if the worms are all raised together, until for 20 ounces, the average does not exceed 25 lbs. of cocoons per oz. Such is the general experience throughout France according to Guérin-Méneville, and it shows the importance of keeping the worms in small broods. Indeed, nine-tenths of all the silk produced in Europe is raised in small quantities, i. e., in separate households.

The young worms may be removed from one place to another by means of a small camel's-hair brush, but should be handled as little as possible. The best mode of managing them is to spread over the hatching eggs a piece of netting or mosquito-bar, upon which are to be placed either plucked leaves evenly scattered or a few leaf-bearing sprigs. The worms will cluster upon the leaves, which, when loaded with them, may be removed from time to time, either by taking the twigs, upon which they do not collect, separately between the fingers, or by lifting altogether with the netting.

This feeding net, which must have larger meshes as the worms increase in size, may be used every time fresh food is furnished, and will save a wonderful deal of time. It entirely obviates the necessity of handling the worms, and enables the person having charge of them to keep them thoroughly clean; for while they pass up through the fillet to their fresh food, their excrement drops through it and is always taken away with the old litter beneath. It really acts as a detective of disease, also, for such worms as are injured, feeble or diseased, usually fail to mount through the meshes, and should be carried off and destroyed with the frass and other debris.

So important is this feeding net or fillet as it may be termed, and so much does it facilitate the caring of the worms, that for many years in Europe it has been made of paper, stamped by machinery with holes proportioned to the size of the worms. The paper has the advantage of cheapness and stiffness, the latter quality enabling its removal, when loaded, without lumping the worms all in the middle. But with a little practice this can be avoided even where other more flexile netting is used; and it is the principle which I wish to lay before the reader—the details of material and method will suggest themselves according to the circumstances.

It is important to get the same batch of worms to go into their sicknesses simultaneously, and as soon as most of those constituting such a batch

begin to lose appetite, become more shiny, and especially when the triangular dark spot appears above the head, feeding should cease, and the shelves or trays be rendered as clean as possible. At each moult there will always be some few which remain sick after the great majority have cast their skins. These should either be set aside and kept separate, or destroyed; as they are usually the most feeble and inclined to disease; otherwise the batch will grow more and more irregular in their moultings, and the diseased worms will contaminate the healthy. Regularity may also be insured by causing those which first shed their skins to wait on their more tardy brethren for one or even two days without feeding; for they can at this time fast without any injury. Indeed, no food should be given till the majority of the batch have moulted.

As the worms increase in size, and become crowded on their shelves or in their trays, they are readily divided by removing the net, when about half the worms have mounted, and replacing it by an additional one.

The food must be renewed as often as the leaves are devoured or as they become in the least way dry, and of course they get dry much quicker when young and tender than when mature.

Many rules are laid down for regularity of feeding, and much stress is put upon it by some writers; but I am convinced that rules are of no avail, as so much depends on circumstances and conditions. In parts of France, for instance, they chop the leaves; but in this country such chopping is worse than waste of time; for Nature has furnished the worm with far better chopping instruments than man can invent; and the chopped food dries much sooner than does the whole leaf. Where the nets are not used, there is an advantage in feeding the worms upon leaf-covered twigs and branches, because these last allow free passage of air, and the leaves upon them keep fresh for a longer time than when plucked. In thus feeding with branches, consists the whole secret of the California system so much lauded and advocated by M. L. Prevost.

The meals most relished are those given early in the morning and late in the evening, and the best time to give them is between 5 and 6 A. M. and 10 and 11 P. M. One or two intervening meals during the day may be given according to circumstances. The leaves given in the morning are best plucked the evening before, as, if plucked and fed with the dew on, they are injurious. During the night the temperature may be lowered a few degrees with impunity, as such lowering is natural and the worms will be more quiet during their night fast. A mean temperature of 75° or 80° F. will usually bring the worms to a spinning point in from 35 to 40 days after hatching, but the rapidity of development depends on a variety of other causes, such as quality of leaf, race of worm, etc. If it can be prevented, the temperature should not be permitted to rise above 80°; and it is for this reason that in our climate a room with a northern or northeastern exposure is preferable to any other.

During the fifth or last age the worms require the greatest care and attention. Frass and litter must be removed often, and all sickly and diseased

worms culled from the rest. Good ventilation must be had, and the temperature be kept as even as possible. At this and at all times during the life of the worms, they must be guarded against the attacks of mice and predaceous insects.

COCOONERY.

When the worms show the signs of spinning, already described, the cocoonery must be prepared by forming arches of the smaller twigs, well dried, of different trees, intermixed with broom-corn, or of any other kind of brush. If tiers of shelves have been used these arches are readily formed by tying together small bunches of twigs exceeding a little in length the distance between the shelves. The feet of these bundles, which should be about a foot apart, are placed upon the lower, and the tips spread out against the upper shelf, insuch a manner that the worms can crawl between them. Where tables are used, arches may be made by intertwining the brush, roof-fashion. The worms will then mount upon this brush and commence forming their cocoons. The thermometer should not be allowed to sink below 80° F. during the spinning, as the silk does not flow so freely in a cool atmosphere. Such worms as do not mount readily, should be separated, and furnished with brush, laid carefully over them. If allowed to remain and spin at the bottom of the arches their cocoons will be soiled by the excreta from the worms above, the last fæces ejected, after the cocoon is commenced, being soft and semi-fluid.

In about a week after the last worms have mounted, or when all sound of spinning has died away, the cocoons may be detached from the brush, care being taken not to taint them with the black fluids of such worms as may have died and become putrid—there being almost always a few such in every cocoonery. The loose silk is then torn from the pods which should be separated according to color, weight, and firmness of texture; those which best resist pressure, indicating that the worm has properly accomplished its work.

CHOKING THE CHRYSALIS.

In most silk-producing countries, the parties who raise the cocoons sell them to the reeling establishments before suffocation is necessary; as these establishments have better facilities for the work than are to be found in private families. The cocoons, which if left over a fortnight would be pierced by the moths, in their egress, are choked either by steam or dry heat. By steam they can be choked in 20 minutes; by dry heat from 2 to 24 hours are required, with a temperature of about 200° F. They are placed in shallow baskets, and these slipped on iron drawers into an oven. A certain humming noise continues as long as there is any life, and its cessation is an indication that the chrysalides are all dead. Where the choking is well done, there is little loss, only about one per cent of the cocoons bursting at the ends. After choking, the cocoons are strewn on long wooden shelves in the shade, with plenty of air, and for the first few days are frequently stirred. After remaining on these shelves for about two months, with occasional stirrings, the chrysalides become quite dry and the cocoons will pre-

serve indefinitely—being subject only to the attacks of *Dermestes* or museum pests which are attracted by the dead chrysalis within, and penetrate and injure the cocoon for reeling purposes.

EGG-LAYING.

There are establishments, especially in Japan, which are entirely devoted to the production of eggs; and most silk-growers prefer to purchase their eggs at the proper season, rather than go to the trouble of caring for the moths and keeping the eggs over winter. When properly managed, so that hygienic rules are carefully carried out, there is an advantage in making the production of eggs a specialty; but their production in too large quantities also has its disadvantage, and it is well for all silk-raisers to provide their own eggs. For this purpose none but those cocoons which are firm, fine and of the right color should be chosen, large size not being so much of an object. Double or treble cocoons, i. e., cocoons which have been spun by two or three worms in company and which, in consequence, are unfit to reel, will often give good moths for breeding purposes. The cocoons, when chosen, may be strung in a chaplet and suspended in the same room where the feeding was done, or they may be pasted on to card-board—the object in both cases being to secure them so that the moths can the more readily make their escape. The male and female cocoons may be approximately separated, by weighing; the whole, say a lot of 50 or 100, being weighed first so as to get at the average, and each being re-weighed separately afterwards; all those below the average to be set aside as males and those above the average as females. The moths come out most abundantly during the early morning hours, and, as they issue, they should be taken by the wings and the sexes kept apart for a short time. The males may then be paired with the females. Coitus, according to the best breeders, should not last more than six or eight hours, and at the end of that time the couples should be separated by holding the female gently by the wings with one hand, and pressing the abdomen of the male with the other. The males may then be thrown away and the females placed for a few minutes on sheets of blotting paper, where they will free themselves of much yellowish or fulvous fluid, which would otherwise soil the cloth upon which the eggs are to be laid. They may then be placed side by side in trays, lined with linen cloth, when they will immediately commence depositing. The trays may be tipped up at one end so that they incline a little, as the moths are then more apt to lay their eggs uniformly. They should also be kept in the dark, in accordance with the nocturnal habit of the moth. Most of the eggs will be deposited in about 24 hours, and the moths may then be thrown away, as eggs deposited after that time are not as well impregnated. No deformed moths should be used. The eggs are best preserved on the cloth where originally deposited, as they are protected by a natural coating of varnish, and, being fastened, the worms when hatching, eat their way out better. For commercial purposes, however, they are usually detached during the winter by immersing the cloth containing them in cool soft water for

a few moments; the moisture being then drained off by means of blotting paper and the eggs scraped off by means of a paper knife. They are then washed in soft water, thoroughly dried and put away for keeping. All eggs which swim on the surface are considered bad, and discarded. The Japanese egg-producers sell their eggs on cards or cartoons made of some kind of coarse silk. The cards are placed in wooden frames, the rims of which are varnished, so that the moths—disliking the varnish—are made to confine their eggs upon the cards, which are consequently covered in a very regular and uniform manner.

REELING.

If the mere rearing of the worm—the production of the cocoons—is simple; the reeling of the silk is by no means so, as the greatest skill is required to accomplish the work properly, and the value of a hank of silk depends as much upon the skill of the reeler as upon the quality of the original thread. In the best cocoons the silk will measure upwards of a thousand feet in length, and though it appears single, it is in reality composed of two threads which are glued together and covered, as they issue from the spinneret of the mouth, with a glossy varnish which enables the worm to fasten the silk where it wills, and which is soluble in warm water.

It is not my purpose to give a detailed description of a reeling establishment, though I made it a point to visit a number of the best around Lyons, when there last summer. Those who contemplate erecting such an establishment in this country will not rely on written description, but will go to headquarters to get their machinery, which is manufactured by Burdet & Cie., Rue Desirée 17, Lyons, France. There is also a little work by M. Turgon, which gives a description of the establishment of M. Louis Blanchon, of Livron. My object is merely to state the facts and principles which should govern the unwinding and reeling, for the benefit of those who may wish to use single basins and mills worked by hand. In the great reeling districts of France everything is brought to such perfection in the *filatures* or reeling establishments, by the aid of steam, that the hand mills have there almost gone out of use. But most of the silk is unwound by hand power in china; and excellent silk may be made by dextrous management with a good hand mill.

Raw silk is classified into organzine, tram and floss. Organzine is considerably twisted and is the choicest. Tram is made from inferior cocoons and is but slightly twisted. Floss is made of the loose silk carded and spun like cotton or wool.

The thread of silk as it unwinds from the cocoon is valueless for manufacturing purposes, several of them combined going to make the staple of commerce.

The persons employed in unwinding silk are mostly women, one standing or sitting before each basin, of which she has entire charge. The basin is made of copper, and in the large establishments the water in each basin is heated by steam at the control of the operator. The cocoons are plunged into the water when it is near the boiling point and moved about so that the

gum which fastens the threads becomes uniformly and thoroughly softened. They are then beaten with a small birchen broom, having the tips split so that the loose threads readily fasten to them. After beating a short time the operator gets all the cocoons fastened, and, taking the bundle of threads, shakes the cocoons till each hangs but by a single one. She now takes up five or more threads, (*brins*) according to the quality of silk wanted, unites them and introduces the combined staple or strand (*fil*) into a little glass eye on one side of the basin. She then forms a second similar strand and introduces it into a second eye on the other side. The strands are then brought together, twisted several times, separated above the twist, and introduced into two other glass eyes or ringlets through which they are led one to each end of the reel or *tambour* which is kept revolving in a steady rapid manner and to which is also given a certain back-and-forth side motion. The great object in reeling is to get the threads uniform, rounded, well joined, properly freed of moisture, and so crossed on the reel that they will not stick or glaze as it is termed. These objects are attained by the twisting and by the to-and-fro lateral movement of the reel, as also by properly regulating the distance between reel and basin. The uniformity of the thread depends on the skill of the operator, who must supply a new thread as soon as one begins to give out. This is called nourishing the silk and is done by dexteriously casting, with the thumb, the new thread onto the combined strand to which it immediately adheres. In this she must use much judgment, for the silk of a cocoon gradually gets lighter and finer as it approaches the end, and the uniformity of strand does not entirely depend on the uniformity in number of the individual threads forming it. Whenever the silk rises in locks the temperature of the water is known to be too hot; and when it unwinds with difficulty, the temperature, on the contrary, is too low. The operator is supplied with a skimmer with which to remove all chrysalides and refuse silk; also with a basin of cold water in which to cool her fingers which are being constantly dipped in the hot basin. This constitutes the whole operation of unwinding; but before the skeins, as they come from the reel, are ready for the manufacturer, they must undergo still further manipulation. The staple is first passed through a cleanser, consisting of a clasp lined with cloth, which catches any loose silk or other matter that may be adhering to it. It is then further cleansed and purged by being passed through four similar cleansers (*purgeurs*); then twisted about 500 times to the yard; then doubled and again twisted about 400 times to the yard. It is finally run on to reels about 1½ feet in diameter and taken off and twisted in a peculiar knot or hank. Through all these operations the oscillating to-and-fro lateral motion is kept up so as to produce the diagonal crossing of the strands; and it will be readily understood that each staple is in the end composed of ten or more of the simple threads first spun by the worm.

The loose or flock silk, together with all which, from one cause or another, cannot be reeled, is soaked in water for three days, boiled for one-half hour in clear lye, washed in rain water, and when dry, carded and spun: it makes an inferior floss silk.

BEST FOOD.

There are several varieties of the Mulberry, some of which are by no means adapted to the wants of the worm. I have tried in vain to rear it on the leaves of our indigenous Red mulberry (*Morus rubra*); but it either refuses them entirely, or dwindles and soon dies upon them. *Morus multicaulis* has been the most extensively planted in this country, but the wood is so tender and the leaf so thin and delicate, in this variety, that it often gets injured by our severe winters and strong winds. *Morus alba*, with its numerous sub-varieties, and *moretti* furnish the best food. They delight in a light, loamy and deep soil, and grow with great vigor in the West. There is a dwarf variety, called the *rose*, which leafs out earlier than the others and this is an advantageous character in our climate.

The Mulberry propagates easily by cuttings or layers and is also readily grown from seed. When grown in plantations for silkworm purposes the trees are best planted 8 or 10 feet apart and kept dwarfed, so that a good supply of young succulent leaves and shoots will always be in easy reach. The tree needs a warm location and should be at least two years old before robbed of any leaves. Leaves grown in the sun, with but little moisture, are the sweetest and make the best silk, and all which are yellow or blighted should be discarded. Where irrigation has to be employed it should be abandoned three or four weeks before feeding time. Where the leaves only are plucked a few of the terminal ones should always be left. In the silk-growing parts of Europe, though often grown in plantation or orchard, the trees are more frequently grown along roadsides and in all sorts of out-of-the-way corners; and a second crop, not used for the silkworms, is carefully gathered just before the natural fall of the leaf in autumn, and used as fodder for cattle, being very nutritious and highly esteemed for this purpose.

Silkworms have been fed on the leaves of a few other plants, and especially on lettuce, which is very useful, in case of too early hatching, as the worms do very well on it during the first age; but seldom attain the spinning age upon it. Some varieties—more especially the inferior ones—take more kindly to it than others.

The mulberry leaf is exceedingly free from the attacks of noxious insects. A species of woolly Aphis called *Kuwa jirami* sometimes covers the leaves in Japan; but no insect of the sort is known to attack them here.

OSAGE ORANGE AS SILKWORM FOOD.

The Osage orange (*Maclura aurantiaca*) first discovered by Lewis & Clark in 1804 and named by Nuttal in honor of Wm. Maclure, the celebrated geologist, and founder of the Philadelphia Academy of Science, is well known as a hedge plant in the West. At first sight it seems to have little affinity with the Mulberry, but it belongs to the same botanical Family (*Urticaceæ*), and next to the Mulberry furnishes the most palatable silkworm food. This plant was first introduced into France in 1820, by M. Cels, of Paris, who received it through Michaux from M. LeRoi of Balti-

more, Md. In 1833 M. P. Farel published a paper on the value of the leaves as a substitute for mulberry leaves in feeding silkworms*, citing the experience of M. Rudolphi, which was not favorable. In 1834, however, M. Farel published a second paper showing how M. Bonafous produced from osage-fed worms, cocoons which were very regular, firm and apparently perfect in every way—the worms being eight days longer in maturing than when fed with mulberry leaves. In 1835, in the Bulletin of the same Association, M. Delile, Prof. of Botany and vice president of said Association, gave a history of *Maclura* and showed that very good cocoons were produced from it. He says ("cette soie a été parfaite, facile à tirer, sans perte du premier jusqu' au dernier bout, dans tous les cocons") that the silk was perfect, easy to unwind, and without loss from beginning to end in all the cocoons.

Still later, M. Seringe, who wrote an interesting paper on the Osage orange† also made experiments with its leaves as food for silkworms, and found that the latter did well upon them. Yet no one in France to-day pretends to use this plant in lieu of the Mulberry.

In 1866 M. Prevost fed some of his worms on Osage orange,‡ and Mr. Glover of the Department of Agriculture, likewise raised some successfully upon it about that time.

For the last four years Mr. Samuel Cornaby of Spanish Fork City, Utah, has had very good success in feeding worms with these leaves. He writes to me:

Last summer [1871] our worms that were fed on Osage orange all did remarkably well; quite a number of persons in this place fed on Osage the past season, and all with good success. Several of my neighbors remarked to me that the worms preferred the Osage leaves to Mulberry, when the two kinds of leaves were within reach: that has also been my own experience. I have never tried any other variety on Osage, but intend this season to try some French Annuals.

I have fed the same worms on Osage orange four successive seasons, and they continue perfectly healthy and vigorous; in fact, I think they have improved since I commenced feeding on Osage. I do not know the exact number of worms that have been fed here the past season on Osage, but believe the number is not less than 50,000.

In 1870 I attempted to feed some worms of Japanese origin on Osage leaves; but I obtained no cocoons, though some of the worms fed well to within a few days of the spinning point. The worms themselves were not of the hardiest, however, and while the fore part of May was unusually cold, wet and changeable, the last of the month was unprecedently hot; so that similar poor results might have been obtained even with mulberry leaves. At all events, in 1871 I had perfect success in feeding Osage, and obtained great numbers of cocoons. At my request Mr. Cornaby sent me a number of eggs produced by his Osage-fed stock, and these were distributed among several friends, and part of them retained. Some were fed on

* Des feuilles de Maclura comme succédanées de celles du Murier. *Bulletin de la Soc. d' Agr. de l' Herault*, 1833.

†Notice sur le Maclure Orangé—*Soc. Royale d'Agr. etc. de Lyon*, Decembre, 1835.

‡Cal. Silk Growers' Manual, p. 60.

Osage; some on Mulberry. From the first the young worms too
Osage with avidity, and I never raised a brood with less mortality;
experience of all those to whom eggs were sent was equally felicit
two instances they were fed in the city of St. Louis, the atmospher
anything but pure, and the leaves often laden with lime-dust and
In one case, where there was some difficulty in procuring leaves, the
were fed alternately on lettuce, Osage and Mulberry, and often m
fast for a whole day; yet they were proof against such hard usag
eventually spun their cocoons with but trifling loss.

As soon as mine began to mount and form their cocoons, I recognized
as a Syrian race which I had often seen feeding in Covent Garden M
in London, England; and upon inquiry I learned from Mr. Cornaby th
stock originally came from London, the eggs having been brought ov
Mr. A. K. Thurber of Spanish Fork City. The cocoons are ovoid, n
more pointed at one end than the other, and of two distinct shades of ye
viz., a bright golden inclining to orange, and a pale-greenish or sulp
Now this race, like most other inferior stock, certainly has the merit of
stitutional toughness and vigor; otherwise the worms could not h
endured the hardships they were submitted to here last year. The worms a
form a very pretty cocoon and are therefore well calculated to give pleas
and edification to the amateur. But the cocoons have little or no comm
cial value; the silk being inferior, and so loosely spun that the major p
of it would beat away and rise in flocks in the basin before the end would
found. I took a number of them with me to France and had them ful
tried. It was this same Syrian race that was fed with Osage orange by
Mathieu Bonafous, in 1834; and though other races have been fed with
it is doubtful if they thrive as well upon it.

Two advantages which the Osage has over the Mulberry must be men
tioned in this connection. 1st. It is hardier, and the young leaves will resis
a late frost which will kill those of the Mulberry. 2nd. The leaves do no
wilt so soon. It leafs out about the same time, though some plants in a
hedge-row are always in advance of others in this respect, and an early
leafing variety might undoubtedly be produced in the course of a few
years, by propagating from such.

The effect of the osage compared with the mulberry leaves is quite
marked. The osage-fed worms generally lose the fresh creamy-white color
during the last age, and the skin becomes more or less shiny and slightly
greenish. The cocoons from these worms are also less firm than those from
Mulberry, the difference being perceptible by trying alternately a handful
of each.

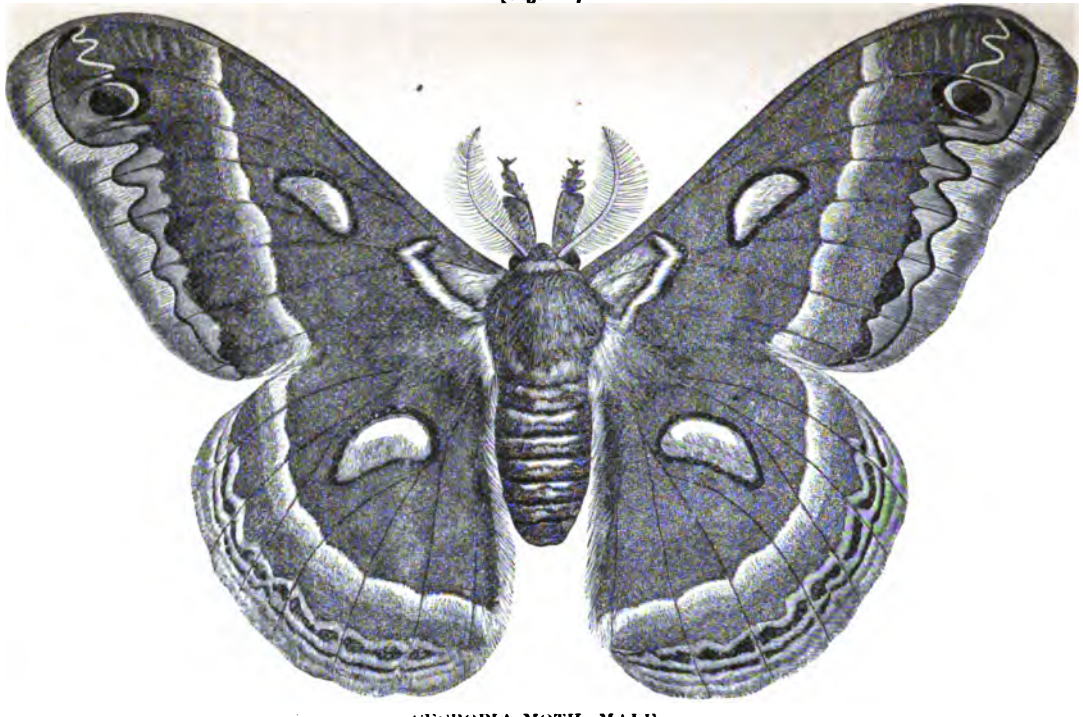
For these various reasons I cannot see any present advantage that is to
accrue from feeding osage, where mulberry leaves can be obtained, though
the former may be very useful on exceptional occasions. As, however, it is
within our power to improve the Syrian race which does so well upon it,
by choosing from year to year only the best and firmest cocoons for breeding
purposes; and as the plant is native and so extensively cultivated, I hope

g worms took
ss mortality; a
qually felicitou
e atmosphere
ne-dust and e
leaves, the w
nd often ma
hard usage.

ecognized:
Tarden Man
rnaby tha
ught over
oroid, ran
les of yell
or sulph
erit of eg
not have
worms also
e pleasur
major pa
d woul
then. In
ingenuity
ed wit

t be a
will be
n do
ns
an
ra

[Fig. 33.]



CECROPIA MOTH, MALE.

Mr. Cornaby will continue his efforts. If we can contrive to furnish our ladies their silk dresses from our own hedgerows, we shall certainly be outdoing those nations which at present rival us; and such a result is not impossible! Indeed, by constantly choosing the darker and more vigorous worms and moths, there is no reason why a race may not in time be produced, which in the climate of Utah, would feed freely out of doors; and in this manner any amount of silk, though perhaps not of the best quality, could be cheaply grown by simply covering the hedges with some kind of netting, so as to protect the worms from birds and other enemies.

THE CECROPIA SILKWORM—*Attacus** [*Platysamia*] *Cecropia*, Linn.

(Lepidoptera, Bombycidæ.)

In the *American Entomologist* for February, 1870, I published an article on this insect from which is quoted much of what follows. Few insects are as frequently sent to me for identification as this magnificent moth (Fig. 33). It is common and its great size and beauty attract general attention. It is also more easily obtained, for the cabinet, than most of our other large moths, because its cocoon is always fastened to a twig where it remains all winter a conspicuous object; whereas those of Luna and Polyphemus, for instance, fall to the ground with the leaves, and are seldom seen. The ground-color of the wings is a grizzled dusky brown with the hinder margins clay-yellow; near the middle of each of the wings there is an opaque kidney-shaped white spot, shaded more or less on the outside with dull red, and edged with black; a wavy dull red band edged inside with white, crosses each of the wings, and the front wings next to the shoulders are dull red with a curved white and black band, and have near their tips an eye-like black spot with a bluish-white crescent; the upper side of the body and legs are dull red; the forepart of the thorax, and the hinder edges of the rings of the abdomen are white, and the venter is checkered with red and white. There is considerable variation in the ground-color of individuals, some being quite dark and others quite light, but the female differs from the male in nothing but her larger abdomen and much smaller antennæ or feelers.

The genus *Attacus*—meaning elegant—was founded by Linnæus, and our moth received its specific name from the same author. As *Cecropia* was the ancient name of the city of Athens, and as it has puzzled some nat-

* We have here an excellent illustration of the effect of the custom of attaching to an insect the name of the author of the genus instead of that of the describer of the species. In 1767 Linnæus described this insect as *Attacus Cecropia*. In 1816 it becomes *Samia Cecropia*, Hübn; in 1852, *Hyalophora Cecropia*, Duncan, and in 1865, *Platysamia Cecropia*, Grote.

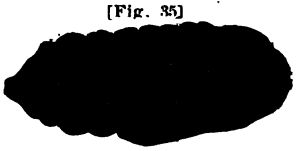
For reasons, repeatedly stated, I shall refer this and the six other large insects which follow, to the old and well known Linnæan genus *Attacus*, indicating in brackets the more recent genus to which each is at present referred by modern systematists. To my own mind it is very clear that they constitute but three distinct genera instead of six; and I should myself refer *Cecropia*, *cynthia* and *Promethea* to one genus; *Polyphemus*, *yama-mai* and *Pernyi* to a second; and *Luna* to a third. In giving this opinion I intend no disrespect either to Dr. Packard, who erected the genus *Callosamia* for *Promethea* (P. E. S. P. III. p. 379), or to Mr. Grote, who proposed another genus *Platysamia* for *Cecropia* (P. E. S. P. V. p. 228); for our present genera are for the most part the creations of man and not of Nature, and men's opinions will always differ. There must be a limit to genus-making somewhere, as no two species agree in all minute particulars; and in their adolescent and perfect states, as well as in their habits, few insects show a closer generic connection than the three first named. The iniquitous law above mentioned has no doubt been the cause of much of this generic hair-splitting; but I do not believe that it will hold its own in entomology even in this country where it has already obtained a foothold.

uralists to divine why Linnæus applied this name to our moth, I give the following explanation by Dr. Fitch: "The great legislator of this department of human knowledge, as he is expressively styled by Latreille, it has been frequently remarked, was endowed with a genius that few of his disciples have inherited, for selecting names for natural objects, which are most appropriate and happy. The idea which was present in the mind of Linnæus, when he named this splendid moth, we think is sufficiently evident. The Athenians were the most polished and refined people of antiquity. The moths are the most delicate and elegant of insects; they are the Athenians of their race. Cecrops was the founder, the head of the Athenian people. When the names of men were bestowed upon cities, ships or other objects regarded as being of the feminine gender, classical usage changed these names to the feminine form. The moths (Phalæna) being feminine, and the name of Cecrops being more euphonius in this form, probably induced Linnæus to change it in the manner he did. The name thus implies this to be the leader, the head of this most elegant tribe of insects, or in other words, the first of all the insect kind. What name more appropriate can be invented for this sumptuous moth?"

[Fig. 34.]

During the winter time, the large cocoons of this insect (Fig. 34) may be found attached to the twigs of a variety of trees. I have found them upon Apple, Cherry, Currant, Barberry, Hazel, Plum, Hickory, Blackberry, Elderberry, Elder, Elm, Lilac, Red-root, Maple, Willow and Honey-locust. It has also been found on the Pear. This cocoon tapers both ways, and is invariably fastened longitudinally to the twig; it is formed of two distinct layers, the outer one, which is loose, wrinkled, and resembles strong brown paper, covering an inner oval cocoon composed of the same kind of silk, but closely woven like that of the Mulberry silkworm. Inside this cocoon will be found the large brown chrysalis (Fig. 35). The cocoon of the Polyphemus moth, an insect which will be presently treated of, and which has been called by Mr. L. Trouvelot, of Medford, Massachusetts, the "American Silkworm," is rounded, and the silk is very closely and compactly woven; and though that of our Cecropia is not as valuable for utilitarian purposes, yet I incline to believe that it will some day be propagated for the silk which it produces; and though it may not lay claim to the national title of THE American Silkworm, it will nevertheless rank as second best, among those which are indigenous to

[Fig. 35]



this country. The following are some of Mr. Trouvelot's reasons, as communicated to me, for preferring Polyphemus to Cecropia:

1st. The silk fibre spun by the latter is not so strong nor so glossy as that of the former. 2ndly. The cocoon of the latter being double, pointed, and open at one end, makes it unfit to reel, as the water of the bath in filling the cocoon would sink it to the bottom, a very unfavorable circumstance, since it would cause the fibres of the different cocoons to entangle and break every moment. 3rdly. The larva of Cecropia is a very delicate worm to raise, it does not suffer handling, and when once feeding on a given species of plant, it does not readily bear changing to another, or even to a variety of the same plant. 4thly. It has the misfortune to be more generally attacked by birds and parasites, four-fifths of them being thus sacrificed in a state of nature.

I entirely concur in the first two reasons given, but since, as I shall presently show, a method has been devised for unwinding cocoons naturally open, such as those of *cynthia* and *Cecropia*, the second objection loses much of its force. As to the last two objections, though they undoubtedly apply in Massachusetts, where Mr. Trouvelot made his experiments, they will not hold true in the West; for I have always been more successful with in-door broods of Cecropia than of Polyphemus, and with us the latter is fully as much subject to parasites as the former, as might have been inferred from its comparative scarcity. I have also learned from several correspondents in the Atlantic States that whereas it was formerly almost impossible to raise a single specimen of Cecropia to the perfect state, they now have no difficulty in rearing any number.

In the month of May, in the latitude of St. Louis, and earlier or later the farther north or south we go, our Cecropia moth issues from its cocoon, and there can be no more beautiful sight imagined, than one of these gigantic fresh-born moths with all its parts soft and resplendent. The unintiated would marvel how such an immense creature had escaped from the small cocoon which remains at its side, retaining the same form which it always had, and showing no hole through which the moth could escape. The operation—so interesting and instructive—can be witnessed by any one who will take the trouble to collect a few of the cocoons and place them in some receptacle which has sufficiently rough sides to admit of the moth's crawling up, to hang its heavy body and wings while they dry and expand. The caterpillar has the wonderful foresight to spin the upper or anterior end of its cocoon very loosely, and when the moth is about to issue it is still further aided in its efforts by a fluid secreted during the last few days of the chrysallis state, and which is a dissolvent of the gum which so firmly unites the fibres of the cocoon. This fluid is secreted from two glands, which open into the mouth, and as soon as the chrysalis skin is split open on the back, by the restless movements of the moth within, the fluid flows from the mouth and wets the end of the cocoon, dissolving the gum and softening the silk to such an extent, that by repeated contractions and extensions of the body, the moth is at last enabled to separate the fibres, and to thrust out its head and unbend

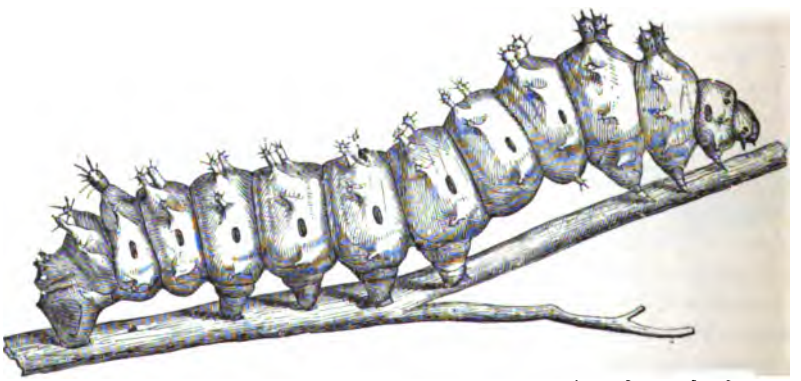
its front legs; after which it rapidly draws out the rest of its body, the mouth of the cocoon afterwards closing, by the natural elasticity of the silk. At this moment the body of the moth is much swollen and elongated, the wings are small, folded, and pad-like, and the whole insect is soft and moist; but, attaching itself to the first object at hand where it can hang its heavy body and clumsy wings, the latter become expanded in about twenty minutes, and the superabundant fluids of the body sufficiently evaporate in a few hours to enable the insect to take wing.

The eggs of the Cecropia moth are 0.09 inch long, sub-oval, flattened and of a pale cream-color, shaded with light brown; and they are deposited in small patches on the plants which are to form the food of the future larvæ. They are deposited in June, and hatch in from six to ten days after being deposited. Some remarkable exceptions have been known, however, and my friend P. R. Uhler of Baltimore, Md., has had them remain over two years, and yet hatch at the end of that time.

LARVAL CHANGES.—The young worms differ so much from the mature ones, and undergo such great changes in appearance in the course of their lives, that it is surprising that no account is to be found of these larval changes in any of our entomological works. When first hatched they are entirely black, with the tubercles placed in the same position, but being larger at the base and with a narrower stem than in the more mature individuals, the upper and smaller end being crowned with a whorl of conspicuous stiff black bristles. After the first moult the body is of a deep orange color, with the tubercles and head black, and with longitudinal rows of black dots running between them. After the second moult, a still greater change takes place; the body acquires a beautiful yellowish-green tint, the tubercles on the back are blue on joints 1, 12 and 13; coral-red on 2 and 3, and yellow with black spines, and a black spot on the inside and outside of the stem, on 4—11; those at the sides are blue, and the head is of the same color as body. After the third moult, the black spots, except a row below the stigmatal row of tubercles, disappear; the tubercles themselves lose all black except the spines, and the head and body become delicate bluish-green rather than yellowish-green as formerly. After the fourth and last moult, the red tubercles near the head frequently become yellow, and when full-grown, the worm measures over four inches, and presents the appearance of Figure 36, the tubercles being respectively of the most delicate yellow and blue.

Two weeks after the worm first began to spin, it changes to a chrysalis, and as already stated, passes the winter in this form, there being but one brood each year.

[Fig. 36.]



The cocoon of this insect is often found to contain a kernel of corn, a grain of wheat, or even an acorn, and the first time I found a corn-kernel in one of them, I was sorely puzzled to comprehend how it came there, and imagined that it must have been accidentally dropped by some

bird, into the meshes of the cocoon while the latter was being formed. But the kernels are found in the cocoons altogether too frequently to admit of any such chance coincidence which must necessarily be of very rare occurrence. There is every reason to believe, therefore, that these foreign materials are placed there, for safe-keeping, by some bird; the loose end of the cocoon admitting of their being forced in, even after it is completed. Dr. LeBaron, thinks that this bird is very likely the Blue Jay which is known to have the habit, in common with other Corvidæ, of pilfering and hiding in holes and crevices any small object that attracts its attention. One of my correspondents from Geneva, Ills., who has found no less than five of these cocoons containing kernels of corn, thinks that the Chickadee (*Parus atricapillus,* L.) uses them as a storehouse, as well as the Blue Jay, and, indeed, inclines to believe that the former is "the sole proprietor." He has seen it, with corn in bill, searching about apple trees for such a storehouse, and has witnessed it deposit a kernel in the crack of a board fence.

The Cecropia worm, as may be inferred from its size, is an immense feeder, and a small number will soon defoliate a young apple tree. It has, on a few occasions, been found numerous enough to do injury in this way; but as a rule, natural enemies keep it so thoroughly in check, that it can hardly be classed as an injurious insect. The same may be said of the other large and native worms which I include with the silkworms, and which on account of their silk-producing qualities may, with propriety, be treated of rather as beneficial insects, though their products have not yet been utilized. Their great size and conspicuity not only renders them a ready prey to their natural enemies, but enables us to easily destroy them by hand-picking whenever they happen to become unduly multiplied on any of our fruit trees.

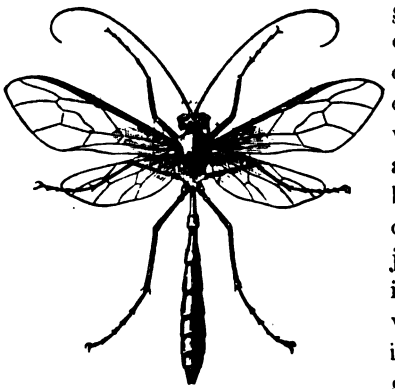
In the Proceedings of the Boston Society of Natural History (Vol. IX pp. 342—5) Mr. S. I. Smith has described a moth by the name of *Samia Columbia,* and it is also mentioned, and the female figured, by Mr. G. J. Bowles of Quebec, in the *Canadian Entomologist* (Vol. III, p. 201.) It is of rare occurrence, and its larval history remains unknown, and I find nothing in Mr. Smith's paper or in that of Mr. Bowles that ought to warrant us in considering it anything more than a variety of *Cecropia;* while there is much that would lead me to consider it either an abnormal variety or a hybrid between *Cecropia* and *Promethea.* Hybrids occur more frequently among insects than most entomologists imagine, and we should be careful how we make new species out of abnormal variations of rare occurrence. *Columbia* does not differ more from the normal *Cecropia* than do several of the varieties of *yama-mai* from each other.

PARASITES OF THE CECROPIA WORM.

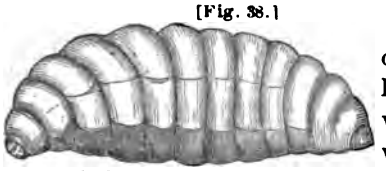
THE LONG-TAILED OPHION—(*Ophion macrurum,* Linn.)—This large yellowish-brown Ichneumon-fly (Fig. 37) is often bred from the cocoons in place of the moth which one expects. It is one of the most common parasites of this large insect, and the females appear to be altogether more common

than the males, for I have bred no less than seven of the former and not a single one of the latter sex. The female, according to Mr. Trouvelot, deposits from eight to ten eggs upon the skin of her victim, and the young larvæ soon hatch from them and commence to prey upon the fatty parts of the worm. But as only one of the parasitic larvæ can find food sufficient to mature, the rest all die from hunger, or else are devoured by the strongest one which survives them. At first one would suppose that this deposition of several eggs by the parent Ichneumon, where only a single larva can develop, is a striking instance of misdirected instinct; but we find a similar prodigality throughout Nature, for every individual is so subject to disasters of one kind or another in its struggle for existence that a provision of several ova is often necessary to insure the future development of a single one, just as we often sow several seeds of some particular plant, in order to insure the growth of a single one.

[Fig. 37.]



[Fig. 38.]



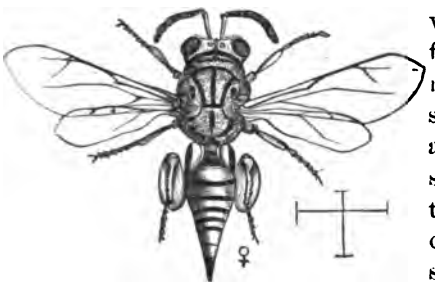
After the Cecropia worm has formed its cocoon, the parasitic larva, which had hitherto fed on the fatty portions of its victim, now attacks the vital parts, and, when nothing but the empty skin of the worm is left, spins its own cocoon, which is oblong-oval, dark brown inclining to bronze, and spun so closely and compactly, that the inner layers when separated have the appearance of gold-beater's skin. If we cut open one of these cocoons soon after it is completed, we shall find inside a large fat legless grub (Fig. 38), which sometimes undergoes its transformations and issues as a fly in the fall, but more generally waits till the following spring.

THE CECROPIA TACHINA-FLY—(*Exorista leucaniæ*, Kirk. var. *cecropiæ*. Riley)—The Ichneumon-fly last mentioned usually causes a dwarfed appearance of the worm which it infests, and parasitized cocoons can generally be distinguished from healthy ones by their smaller size. The larvæ of this Tachina-fly, which is also parasitic on the Cecropia worm, seem to produce an exactly opposite effect—namely, an undue and unnatural growth of their victim. In the beginning of September, 1866, I received from Rockford Ills., an enormous Cecropia worm. It measured over four inches, was a full inch in diameter, and weighed nearly two ounces; but like many other large specimens which I have seen since, it was covered with small oval opaque white egg-shells, clusters of four or five occurring on the back of each segment, invariably deposited in a transverse direction. The skin of the worm was black where the young parasites had hatched and penetrated. This large worm soon died and rotted, and in about twelve days a host of maggots gnawed their way through the putrid skin. These maggots averaged

about one-half inch in length, and in form were like those of the common Blow-fly. The head was attenuated and retractile and furnished with two minute curved hooks, and the last segment was squarely cut off, slightly concave and with the usual two spiracles or breathing-holes which this class of larvæ have at their tails. Their color was of a translucent yellow, and they looked very much like little pieces of raw fat beef. They went into the ground and remained in the larva state all winter, contracted to pupæ in the April following, and the flies commenced to issue the last of May. This fly differs only from the Army-worm Tachina-fly (*Exorista militaris*, Walsh, Rep. II, Fig. 17) in lacking the red tail entirely or in having but the faintest trace of it, and I consider it but a variety of that species. I infer that this same Tachina-fly attacks the Cecropia worm in widely different parts of the country; for I have received from Mrs. Mary Treat, of New Jersey, two dipterous pupæ which probably belonged to this species, and which had also in the larva state infested a Cecropia worm.

THE MARY CHALCIS-FLY—(*Chalcis mariæ*, Riley)—In May, 1869, I received from Mr. V. T. Chambers, of Covington, Ky., numerous specimens of the beautiful large Chalcis-fly figured herewith (Fig. 39), which he had taken from the cocoon of the Polyphemus moth, which is quite common, and issues as early as the middle of February in that locality. He says, "I was satisfied that the cocoon did not contain a living Polyphemus and therefore opened it. It contained so little besides these insects and their exuviæ, as to suggest strongly the old idea that the caterpillar had been metamorphosed into them (as in a sense it had). There were 47 of them, of which 23 were females. As all the males and some of the females were dead when I opened the cocoon, I think it likely that the former never do emerge, and perhaps but few of the latter; otherwise Polyphemus would soon be exterminated."

[Fig. 39.]



I can very well imagine that most of these Chalcis-flies would die in their efforts to escape from the tough cocoon of the Polyphemus, but it so happens that these same parasites have been found by Mrs. Mary Treat, of Vineland, N. J., to prey upon the Cecropia worm, from the cocoon of which they can more easily escape. The same fly also attacks the Promethea worm, and Mrs. Treat has had a similar experience with Mr. Chambers, of finding them dead in its cocoon. She has upon two occasions found cocoons with a dead Chalcis-fly fast in the hole which it had eaten to make its escape; and upon cutting open such cocoons they were found literally packed with dead Chalcis-flies. It would seem that they all make their escape through the hole made by some one of their number, and that if this particular one fails in the undertaking, they all perish rather than make holes for themselves.

I subjoin the original description of this fly which is of a yellow color, marked, as in the figure, with black:

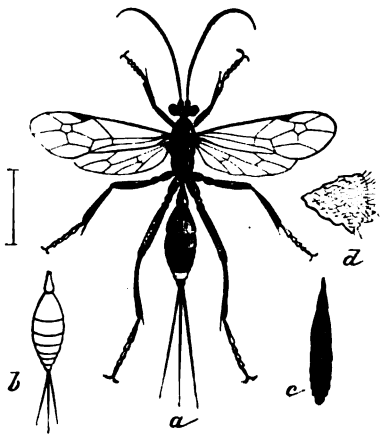
CHALSIS MARIÆ, Riley—♀, yellow, beautifully marked with black. *Head*, yellow with an arcuate black mark behind base of the antennæ, connected with a fine short longitudinal black line leading to lower ocellus, and from thence to posterior margin of occiput which is margined with black; prothorax with a medium black dot. *Antennæ* (scape plus 9 joints) 10-jointed; scape fulvous with superior edge black, flagellum dark brown or black. *Thorax* with large shallow close-set punctures: mesothorax somewhat striated transversely, trilinear with black, the three lines connected by a transverse line which separates the prothorax from mesothorax, the middle line straight, the outer ones deeply impressed, approaching behind and connected on the posterior margin by a short transverse line, and then suddenly diverging on lateral suture of scutellum; a longitudinal black dot on each side over tegulæ; scutellum edged anteriorly with black and with a central longitudinal black line; basal margin of metothorax, with a spot on each extreme side and a large subtriangular mark on disk, black; pleuræ with two black lines on each side. *Wings* hyaline. *Abdomen* yellow with sometimes a faint tinge of green, black at base and tip, and each segment banded with black superiorly; petiole yellow, black at tip above. *Legs* yellow, the tarsi inclining to fulvous; a broad line on posterior coxæ above, and interior edge of femora and tibæ, and tip of femora, black; the femora about as large as abdomen with over 12 minute black spines on inferior edge. Average length 0.20 inch.

♂ differs in the less pointed abdomen, and somewhat longer petiole, in the scape of antennæ not being black superiorly and being much more robust; in the flagellum being of the same color as scape, and in the coxæ having a black line both above and beneath. Average length 0.15. Described from 10 ♂'s 4 ♀'s bred from *Attacus Polyphemus* and 2 ♂'s 1 ♀'s bred from *A. Promothea*. Variable in size some ♂ ♂ being much larger than some ♀ ♀.

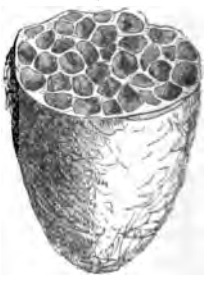
Say's *amœna*, bred from a *Thecla*, in which no sexual difference is mentioned, somewhat resembles the ♀ of this species, but differs from it principally in having the thorax quadrilinear with black, the petiole black, the pleura black, with four yellow spots, and in the thighs having six or eight *prominent* spines, the superior one divided into three or four.

THE CECROPIA CRYPTUS—(*Cryptus extramatis*, Cresson).—Another Ichneumon-fly often infests the Cecropia worm, the larvæ filling its cocoon so full of their own thin parchment-like cocoons, that a transverse section (Fig. 40) bears considerable resemblance to a honeycomb. The flies issue in June, the female presenting the appearance of Figure 41, *a*, the hair-line showing natural size. The wings have a smoky appearance, caused, as may be seen when viewed under a microscope, by innumerable little hooks regularly arranged over their surface as at *d*. The antennæ have a pale annulus, the head and thorax are black, the abdomen reddish-brown except near the end where it is black tipped with white; and the legs are reddish ringed with black. The male has a more slender abdomen which lacks the ovipositor and the white spot at its tip. This sex has not yet been described; for what Mr. Cresson took to be the male turns out to be the male of another species (*C. nuncius*, Say), which infests the Promothea worm, and the female of which has a much shorter ovipositor (*b*). *Cryptus samiæ*, Pack., which, for reasons given below, may turn out to

[Fig. 41.]



[Fig. 40.]



be but a variety of *extrematis;* and *Cryptus Smithii*, Pack., (Proc. Bost. Soc. Nat. Hist., IX, pp. 345–6) infest the form that has been described as *Samia Columbia.*

As the ♂ of *extrematis* has not yet been described, and as upon comparing numerous specimens, in conjunction with Mr. Cresson, it appears that his ♂ *extrematis* is really ♂ *nuncius*, Say, I shall append Mr. Cresson's original description of the ♀, with a few amplifications, and then describe the ♂ by comparison. It is proper to add that Say's description of *nuncius* is so incomplete that the ♂ is not clearly made out, and from ought there is in the text he may have described from a single ♀ specimen; and the ♂ ♂ of the two species could only be separated by breeding, and by comparison of numerous specimens.

CRYPTUS EXTREMATIS, Cress., ♀—"Black, shining, somewhat robust; head short and broad; antennæ as long as the body, slender, black, the 7th to 12th [more often 11th] joints white [or dirty yellow], the 3rd and 4th joints long, the 3rd rather the longest, 5th a little shorter than the 4th, and the 6th about half as long as the 3rd. [Palpi black or only white at joints]. Thorax finely punctured, the dorsal lines rather deep; scutellum subconvex, polished; metathorax finely scabrous, opaque, its base smoother and shining, the elevated lines tolerably well defined, forming a large more or less distinct, subrhomboidal central area, lateral tubercles not well defined. Wings faintly tinged with fuscous; nervures and stigma blackish, pale at base; areolet large, subquadrate. Legs pale rufous, [the front coxæ black] the posterior femora and tibæ at tips, and the base and apex of their tarsi blackish [basal joint always black], rest of their tarsi white. Abdomen rather stout, sub-ovate, polished, rufous or yellowish-rufous; basal segment strongly arcuated, broad at tip; the 4th and following joints black, the 6th or 7th [mostly 7th] or both, more or less white above; ovipositor about as long as the body [abdomen], rufous, valves black. Length 4—5¼ lines; expanse of wings 6—9¼ lines."

♂—Differs from ♀ by his more slender abdomen, by his front coxæ being rufous sometimes tinged, especially above, with black; his posterior coxæ black or blackish, especially above; his four anterior trochanters paler; his palpi white, the terminal joint a little dusky; his antennæ with the two basal joints black, the rest brown on the upper surface interrupted by a paler yellowish line from joints 9—15 or 16, uniformly pale testaceous on the lower surface; the basal abdominal joint rufous, more or less tinged with black; the apex of abdomen, or from 5th to last joint, entirely black with no white spot.

I have bred 7 ♂s, 29 ♀s all from one cocoon of *Cecropia*, and have received 10 ♀s, 2 ♂s, also bred from the cocoon of that species, from Mr. Otto Lugger now of St. Louis. Other specimens bred from *Cecropia* are in the collection of the Entomological Society at Philadelphia and they all agree closely.

C. extrematis ♀ may be distinguished from *nuncius* ♀ by the palpi being always mostly black, by the posterior tarsi being always broadly black both at base and apex, by the greater length of the abdomen and especially by the greater length of the ovipositor *which is as long as the abdomen*, or nearly so. *Extrematis* ♂ differs from *nuncius* ♂ by the four anterior coxæ being rufous, the front ones inclining to black, by the basal abdominal joint being rufous, by the apex of abdomen being black with no white spot, and by the posterior tarsi being broadly black at base and apex.

C. nuncius, ♀ may be distinguished from *extrematis* ♀ by the palpi being more or less white, by the posterior tarsi being generally entirely whitish, except terminal joint; by the broader and shorter abdomen, and more especially by the ovipositor being much shorter, *never exceeding one-half the length of abdomen*. *Nuncius* ♂ is distinguished from *extrematis* ♂ by the four anterior coxæ being white, the posterior tarsi generally entirely whitish except terminal joint, by the basal abdominal joint being generally black, and by having generally—not always—a white spot on joints 6 or 7, or both.

I have bred 6 ♀'s from the cocoon of *Promethea*, and Mr. Cresson has examined numerous specimens of both sexes likewise bred from *Promethea;* and they all agree, though the species is more inclined to vary than *extrematis*, and especially in the size and conspicuousness of the white apical spot. Were it not that Say's *nuncius* was also bred from the same species I should feel inclined to believe it distinct from the species here characterized as such; but rather than describe a new species I prefer to believe that Say inadvertently overlooked the white apical spot on abdomen of ♀ or that it may have been more or less obsolete; and that he either had no ♂, or overlooked sexual differences.

If authors were more careful in describing species, and especially if they would tell us how many specimens they describe from, these difficulties in separating them would rarely arise.

The only other species, which I know of, at all likely to be confounded with *extrematis*, is one subsequently described as *Cryptus samiæ* by Dr. Packard (Proc. Bost. Soc. Nat. Hist. Vol. IX p. 345; 1865.) and bred from *Samia Columbia*, Smith, in whose cocoon it forms a collection of its own cocoons just as *extrematis* does in those of the genuine *Cecropia*. Indeed if we substitute the words "trochanters" for "coxæ" and "coxæ" for "trochanters," in Dr. Packard's description, it agrees in every minute particular with *extrematis*, except in lacking the apical white spot in the ♀. From the similarity of habit, and from the exact similitude in every other respect, I strongly suspect, therefore, that Dr. Packard has inadvertently misapplied the terms "coxæ" and "trochanters;" that the white apical spot, which is variable in size, may sometimes become as obsolete in the ♀ as in the ♂, and that *samiæ* should at the most be considered a variety of *extrematis*.

THE AILANTHUS SILKWORM—*Attacus* [*Samia*] *cynthia*, Hübn.

(Lepidoptera, Bombycidæ.)

Of the different worms which have been introduced from Asia, either into Europe or America, the Ailanthus worm is the only species which has, so far, proved hardy; or which has become fully acclimated. Indeed it seems to possess the same vigor of constitution so characteristic of the tree upon which it feeds, and which enables that tree to flourish on all kinds of soil and in widely different latitudes. This merit at once gives it a claim to our attention.

DIFFERENCE BETWEEN THE CASTOR BEAN AND AILANTHUS SILKWORMS.

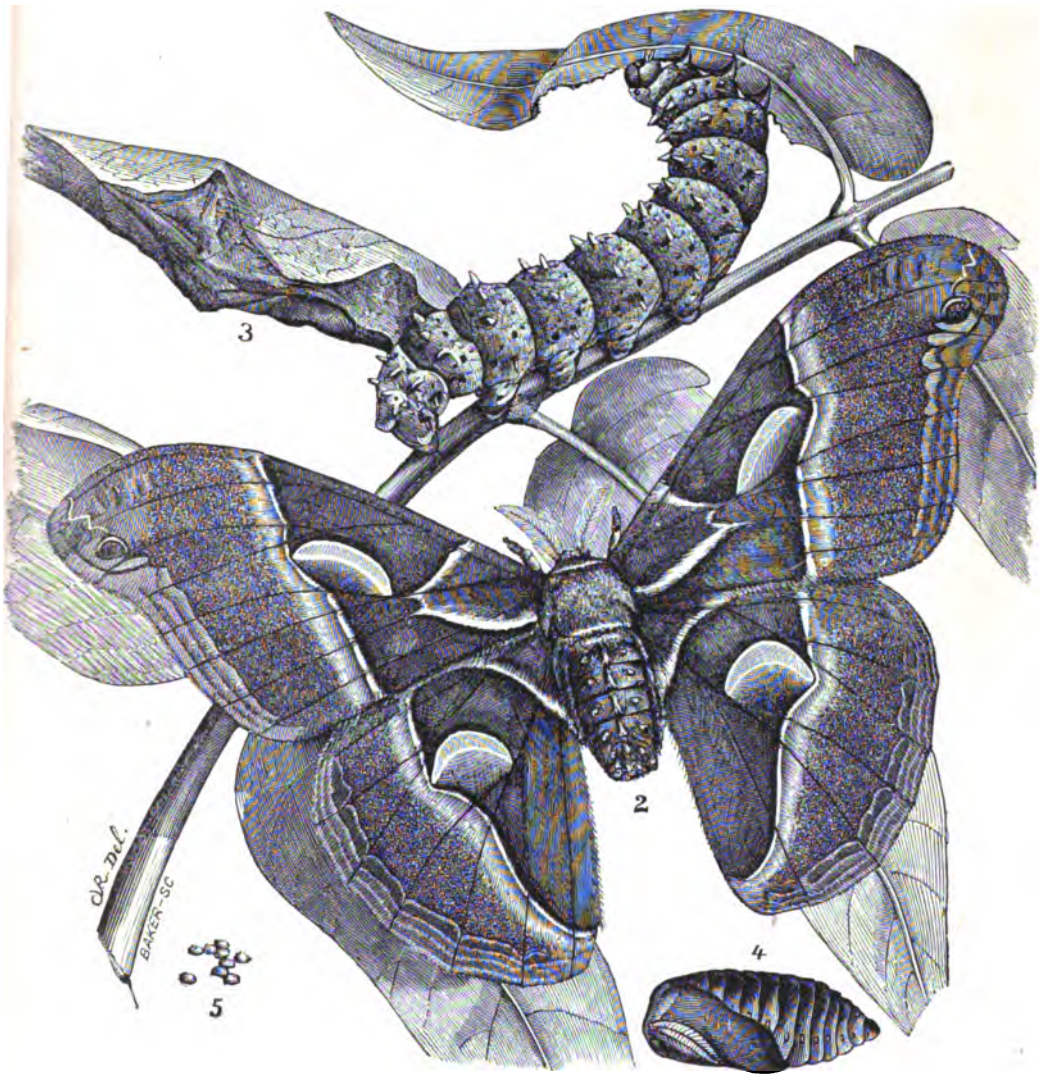
There are two insects which very closely resemble each other. One was brought from India, and feeds on the Castor Bean (*Ricinus communis*). It is domesticated in Hindostan and was introduced into France by M. Milne Edwards in 1854, and was tested at Paris, and at many other points in France, Italy, Spain and Algeria. The silk is soft and glossy, and the worm goes through its changes with great rapidity, producing four or five generations annually. The rearing of this insect was soon abandoned in Europe, because in the first place it had no advantage over the Ailanthus worm, and in the second, there was no prospect of obtaining, in that country, any great quantity of a raw material which depended on the Castor Oil plant for its production; for there, as with us, the plant is only annual, and kills down each winter. It has been ascertained, however, that the worm will feed and flourish on Lettuce, Chickory, Willow and Teasel (*Dipsacus.*).

This insect was first figured in 1804 by the English botanist Roxbury,* who confounded it with the genuine *cynthia* under consideration. It likewise feeds upon the Ailanthus, and the resemblance to *cynthia* in all stages, is so great, that it might well be considered as but a Castor Bean feeding variety; the more especially as both insects are known to vary greatly, and that in its domesticated state in Bengal, *ricini* acquires an orange color, and looks quite different to what it does in the feral state.† The hybrids of the two are also quite vigorous and fertile *inter se*. But in 1857 M. Guérin-Mèneville pointed out what he considered sufficient specific differences, and the *Ricinus*-feeding from is now known to entomologists as *Samia ricini*, G-M. These differences may be briefly set forth as follows: While the egg of *cynthia* is covered with dark particles, that of *ricini* is immaculate. The full grown larva of *cynthia* is of an emerald green, with black specks, and dark freckles; while that of *ricini* is of a pale azure and lacks the spots. The cocoon of the former is larger, more compact and of a paler gray than that of the latter, and while the former produces but two or at the most three broods, the latter produces five or six, annually. The moths when closely examined will be found to differ in some essential points: *Cynthia* has separated white tufts on the abdomen, while *ricini* has them

*Trans. Linn. Soc. of London VI, p. 42, pl. III.

†See also some interesting observations by Dr. A. Wallace, in a paper "on some variations observed in *Bombyx cynthia* in 1866"—(Trans. London Ent. Soc. Feb. 4th, 1867.) where he gives reasons for believing that both *ricini* and *Guerinii* are enfeebled varieties of *cynthia*.

[Fig. 42.]



AILANTHUS SILKWORM.

united in parallel bands, but these characters cannot be relied on as they connect by variations: in *cynthia* the rosy band across the wings is broader than in *ricini*: the crescent-shaped lunule on the front wings of *cynthia* is yellow beneath, the yellow being bordered with white above; in *ricini* the white surrounds the yellow, and the lunule is generally smaller.

A third species by the name of *Guerinii* has been described, but with scarcely any evidence that it is anything more than a variety of either of the former.

RETROSPECTIVE HISTORY OF THE AILANTHUS SILKWORM.

The Ailanthus silkworm was first mentioned in the writings of missionaries about the middle of the last century. In 1760 or 1765, according to Dr. Morris, a fair figure of the moth was published by D'Aubenton the younger, who called it the *Croissant.** In 1773 Drury gave the moth the name which it now bears, but its larva, and general habits were not known till the middle of the present century.

The first eggs of the Ailanthus silkworm obtained in Europe were sent by the Abbé Fantoni, a Piedmontese missionary, from the province of Shang Tung, a little south of Pekin, in the north of China, to some friends at Turin. From these eggs two successive generations of worms were produced in 1857, and in 1858 Mons. Guérin-Méneville received from Turin, both eggs and fertile females, and experimented with them in the acclimatization gardens in Paris.

From the very outset this worm promised well. It adapted itself readily to the climate and its food-plant was everywhere abundant. Soon after its introduction into France it attracted the attention of scientific men in England and other parts of Europe; and the Emperor himself, charmed by the tune of the words chanted to him by M. Guérin-Méneville, and the evident prospect of the success of the new enterprise, lent his aid to the carrying out of experiments on a large scale, and in the summer of 1859 thousands of the caterpillars were reared on M. Aquillon's property at Toulon, and also on that of Count Lamotte Barace, near Chinon, (Indre et Loire).

In 1859 Mr. F. Moore of the East India Museum, reared a few in England, and exhibited them before the London Entomological Society. Subsequently they were fully tested in England by Lady Dorothy Nevill of Dangstein, Dr. Alexander Wallace of London and others. Mr. Wallace, in 1865 published an interesting memoir on the subject, entitled "Ailanthiculture, or the Prospect of a new English Industry," in which he showed that the worm did very well in that moist climate. Indeed it was supposed to do better in England than in France, and the following paragraph which I quote from the memoir will very well reflect the opinions and hopes entertained at the time.

In 1862, at Lady D. Nevill's town house, I first beheld these beautiful larvæ feeding on the leaves of the *Ailanthus glandulosa*. In 1863 I became possessed, through the kindness of her ladyship, of some eggs and procured others from France, and I obtained that summer, as also in 1865, two gen-

* Planches d' Histoire nat., enluminées, X, pl. 42. Ins.

erations. In confirmation of the statement that the cocoons in England were remarkable for their size, M. de Roo van Westmas, writing from the Netherlands, a moister and more temperate clime than France, in August, 1864, says "The acclimatization of *B. Cynthia* has perfectly succeeded, and presents a remarkable fact, viz., that the race is, without doubt, ameliorated. The moths are larger and more vigorous than those of the preceding year. The females laid last year from 100 to 150 eggs, but now give from 300 to 350, and what is still more remarkable is, that the eggs are larger and heavier, for whereas before a gramme contained 540—560, now I find only 440—460 in that weight; this fact appeared to me of such importance that I counted the eggs in five grammes taken from a weight of thirty grammes. I found the number 2261 which gives an average of 452 eggs to a gramme." A gramme being equal to 15½ grains (nearly), this gives twenty-nine or thirty eggs to the grain. My own experience tallies exactly with that of Mr. de Roo; specimens bred in 1865, the progeny in part of French eggs purchased in 1863, exhibited as the result of two years' acclimatization in England a marked improvement in size, color, etc., in all their stages, as contrasted with their French progenitors, and the cocoons were finer in 1865 than in 1864. Lady Dorothy Nevill also reports that the English eggs and cocoons are finer than the French. If this be proved by further observation it becomes an important argument in favor of English Ailanthiculture, for a larger cocoon implies a greater weight of silk.

WHEN INTRODUCED INTO AMERICA.

In 1861 the Ailanthus worm was introduced into this country, the credit of which is due to Dr. Thomas Stewardson of Philadelphia, Pa. Two able and interesting papers on the subject were published by Dr. J. G. Morris of Baltimore, Md., in the Agricultural Reports for 1861 and 1862, great hopes being entertained as to the success of the new enterprise.

Since that time the insect has been raised by a great many different persons in the United States, and has been fully experimented with. In the summer of 1865 I gave it a very thorough trial at Chicago, and raised large quantities both indoors and on trees in the open air; and the following paragraphs from an article which was published in the *Prairie Farmer* of April 28th, 1866, will serve to illustrate its real value:

I raised two broods last summer without difficulty, the last worm of the second brood having spun on the 23d September. Not one died, either of those raised in doors or out on the trees exposed to the weather, except by accident or from the attacks of birds.

So, therefore, as regards hardiness and adaptibility to our climate there is little question of its merit, there being few places on our continent subject to more sudden changes and extremes of temperature than Chicago; but in an economical point of view, the sanguine expectation of its advocates have not been realized, and notwithstanding the furore which it at first occasioned in France and the much that has been said in its favor by our Commissioner of Agriculture,* it never will take the place of the Mulberry Silkworm, and M. E. F. Guérin-Menéville is at this day making researches for, and experimenting with other worms, and has lately laid before the Academy of Sciences, Paris, a species of Bombyx (*Antheræa*) which was obtained on the frontier of Cashmere and feeds on an Oak, (*Quercus incana*).

The Ailanthus worm has two rather serious disadvantages. The cocoon

* Isaac Newton was incumbent at that time.

is prolongated and its threads are attached by strong and very tenacious gluten; for which reasons it has never been successfully unwound, and even carding is not an easy operation. In endeavoring to dissolve this gluten by different compositions, I obtained great quantities of a soapy substance or varnish, which might perhaps be turned to some use. When, by patience, I succeeded in dissolving the gluten from a few cocoons, sufficiently to unwind them, the thread often broke by the weight of its own cocoon. The silk when wound off compares unfavorably with that of some Mulberry worms I reared several years ago: the threads have not the gloss, are not as thick by one-third, and not over one-half as strong. Mr. Townend Glover, Entomologist to the Department of Agriculture, while in Paris last summer, made many inquiries about new silk-reeling machines for the purpose of unwinding the cocoons, but could learn nothing about them.

THOROUGHLY ACCLIMATED IN AMERICA.

Since 1866 this worm has become thoroughly acclimated, and is now found in a wild state around the cities of Baltimore, Washington. Philadelphia, New York, Brooklyn and Chicago. Indeed, it had multiplied to such an extent in 1870 around Brooklyn, that the Ailanthus trees were in many parts of the city entirely stripped of their foliage by it. The bare petioles bore unmistakable evidence of the hardihood of the worm, and of its power to multiply so as to become a nuisance. Singularly enough, a certain Mr. J. Q. A. Warren, who travels between this country and Europe, and deals in natural history specimens, was at this very time attempting to get government aid for the introduction and encouragement of this insect.

Arriving from Europe, in apparent ignorance of what had already been done in this country, and possessed of a sort of a seri-mania, he extolled it in a most enthusiastic manner in lectures delivered before the scientific academies of our principal cities.

It has also become so abundant in Australia, where it was introduced some years since, that unless kept down by birds, it will soon become a perfect pest. One interesting fact connected with its naturalization as an American citizen, is that, as I am informed by Mr. J. S. Ridings of Philadelphia, the moths reared in a wild state in that city have very generally become darker than they originally were; thus showing how, in a very few years, change of conditions and especially of climate may affect coloration. During the past year, for some reason, it has not been as abundant as it was in 1870.

VALUE OF THE COCOON.

The silk is valuable in the same sense as that of some of our native worms, and if ever the supply from the Mulberry silkworm should fail, would undoubtedly be turned to good account. It bleaches well, and has long been used in China, where it is known to be so durable that a dress made from it frequently descends as an heirloom for generations. It has for many years been in the market in France, and I saw specimens of manufactured stuffs from it, both in London and Paris, and they had taken on sundry dark colors very well, and looked remarkably fine. I understand

also from Mr. P. R. Uhler of Baltimore, that specimens have been woven successfully in Paterson, N. J. This class of goods is known by the name of *Ailantine* and might be put to a great many uses, as there is always a demand for coarse silks. But it has so far been woven principally from carded silk, and no cheap, efficient and simple method of reeling the cocoons has been made public. The value of any silkworm depends on our ability to unwind its cocoon. The cocoon of the Ailanthus worm, like that of our *Cecropia*, is open at one end, and though the thread is continuous, and if disengaged of the glutinous matter which binds it, may be continuously reeled off; yet such reeling is rendered extremely difficult from the fact that the moment the cocoons are placed in the basin they fill with water, sink to the bottom, and cause the threads to continually break.

Several devices for unwinding the cocoons have been patented in Europe, but as already stated, none seem to have come into general use. The method invented by M. Forgemol, and described in a report made in 1864 to the Imperial Society of Acclimatization, in France, will indicate in what direction experiments may be made, and I copy the description of that method from Dr. Wallace's essay. M. Forgemol says:

By way of experiment, seeking to follow in your steps, I myself, a short time ago, exhibited before you a particular method of reeling open cocoons. This method has since been studied anew, and I have thought it right to bring before you the following alterations. Let me remind you that the cocoons conveniently prepared were placed within linen or some other fabric permeable to water; were then passed through many waters in succession containing soap and potash, in order to separate the different layers of silk which compose the cocoon; were placed, not too dry nor yet too moist, in a vessel of a cup-shape (either one or in compartments), and were then reeled when nearly dry—differing from the method of reeling closed cocoons, which is done on the surface of water more or less boiling.

Such was our first method. The following are the modifications resulting from our experience:—It seemed easier, and likely to save time, to have a plate divided in several cups, which might be removed at will, and to place therein the cocoons for reeling. This plate, of any form, should fit the basin of the ordinary winding machine, such as they use in the South of France. Each cup is pierced with little holes in its centre, for the admission (if desirable) of steam from the hot water in the basin, in order to supply the necessary amount of moisture which the cocoons may have lost. No change is made in preparing the cocoons and reeling them when nearly dry, but they are placed in the moveable cups pierced with holes fitting into the plate as described. These plates, with moveable cups, are well suited to reel cocoons naturally open, so long as they contain the chrysalis (plein), but seem no longer to answer when the cocoons are empty (vides), that is, when the moth has escaped.

In fact, the force used to draw apart and collect the single threads (*brins*), no longer finds a counterpoise in the empty cocoons, which do not remain in the cups, but are drawn out. Hence it becomes necessary to give the empty cocoon a certain weight, a certain resistance, sufficient to retain them "in situ," but not so great as to rupture the threads. After considerable experience, I conceived an apparatus intended to retain the empty cocoons, and yet to allow the reeling to proceed easily and rapidly. This apparatus is composed of several skewers (*broches*), carrying needles of varying height, and it is placed on a basin for the purpose, if necessary, of

keeping the cocoons in a state of slight moisture, by means of steam from water beneath, more or less boiling in the basin. These empty cocoons are reeled, as we have already stated, when nearly dry, but yet they require a certain amount of moisture, which is indispensable for the perfect torsion of the several threads (*brins*), which go to form the one strand (*fil*). The needles have, 1st, an olive-shaped head, which is capped by the empty cocoon, suitably prepared beforehand and divested of its outer envelope; 2ndly, a middle portion sliding through a ring, secured by an upright (*guide, parti sur les broches*) attached to the skewer; and 3rdly, a base, with a blunt point, which revolves in a little cup worked in the thickness of the skewer.

The needles are very moveable on their pivot, and the cocoons being moveable also on the olive-shaped heads, turn on them in every direction, following the position and the direction of the threads as they unwind. The head is olive-shaped to avoid making a hole in the base of the cocoon during the movement and rotation by the resulting friction, which must ensue were the head pointed. The needles are of different lengths to allow more cocoons than one to be reeled off at once, those of the first skewer being the smallest, those of the second bigger, and so on according to the number of the strands and the required thickness of the thread. The skewers, armed with needles of different height, after being capped with empty cocoons suitably prepared, are placed on the basin so that two or more may be used at once. So arranged, the skewers slide into a groove made into the frame of the machine. They are kept apart by a little bar of division fixed at either extremity. When the cocoons are reeled the skewers, whose needles are now free, are pushed forwards and removed, they are immediately replaced by others prepared beforehand, and placed ready at the end of the groove. There is no interruption in reeling; the mechanism of the skewers and needles is both simple and easy. These, as also the plate with moveable cups, are easily and without cost adapted to the well-known machine, which seems a great advantage since the old implement for reeling closed cocons is now made available, almost without change, by the simple method which I have described."

ITS NATURAL HISTORY.

The female deposits, on an average, two hundred and fifty eggs (Fig. 42, *5*). These are about 0.07 inch long, oval in form, and of a cream color. They are spotted in places with dark green or black particles which can be rubbed off and which under the microscope are found to consist principally of gum, mixed with minute hairs. They become depressed four days after being deposited and acquire a greener hue just before hatching. The shell is very hard and tough and the clicking noise mentioned in speaking of the eggs of *mori* (p. 86) may often be heard. The moth fastens them by means of a gum with tolerable firmness to whatever object she may be upon. They are however easily detached, and if subsequently placed on moist cloth or paper will again adhere. They hatch at a temperature of 65° Fahr.

LARVAL CHANGES—The young worm is yellow, with a dorsal, subdorsal, and stigmatal row of black spots—each row with two to a joint—the anterior one in the stigmatal row being the smallest and the posterior one the largest. Between each of these rows, in the middle of each joint, is a black tubercle, crowned with white bristles, and there is an additional row (6 in all) which is substigmatal. The head is polished black, and there is a black patch on joint 1, on the caudal plate, and on the outside of the anal prolegs. The thoracic legs are black, and the prolegs yellow with a black mark outwardly near extremity. After the first moult the head is brown and the tips only of the tubercles remain black, the rest of the stem being light yellow. After the 2nd moult the color is paler, being of a cream-yellow: the head is entirely yellow, except the feelers which are brown, and all the tubercles, except the stigmatal row, are cream-colored, with bristles ending in a knob of the same color: the stigmatal row is black, with cream-colored bristles: legs of a bright yellow: stigma-

ta black. At this stage a mealy powder begins to manifest itself on the surface of the body. After the 3rd moult it is of a still paler cream-color, and only the stem of the stigmatal tubercles remains black, the knob and bristles being cream-colored: the head, legs, and anus are now sulphur-yellow; the stigmata are larger, and there are two black spots at base of prolegs and three at base of thoracic legs, the central one elevated and forming, as it were, a spine. (These spots are often visible after the second moult.) The white powder-like or wax-like secretion, now covers the body-giving it a most delicate look. After the last moult the tubercles become blue—the lower row having black at base—and as the worm approaches its full growth, the white powder for the most part gets rubbed off and vanishes. When full grown it appears as in the upper part of Figure 42 and is of a light mealy bluish-green, freckled—aside from the black or, as they now often appear, blue-black spots already mentioned— with numerous roundish spots of a darker green, more decided laterally and ventrally; the head and thoracic legs are shiny yellowish-green, and the prolegs and anal joint pale orange-yellow.

Within a month after hatching the worm spins up, forming its cocoon (Fig. 2, *3*) within the leaf which is drawn partly around it, and fastening the leaf stalklet to the main stalk with strong silk. In five days it becomes a chrysalis (Fig. 2, *4*) and, if of the first brood, produces the moth within three weeks afterwards. The second brood of worms generally have the instinct to fasten their cocoons to the more permanent twigs, to which they hang securely during the winter; but they often attach them to the leaf stalk, with which they are carried to the ground in the fall; and the streets of the cities in which they have become wild are often strewn with such cocoons which get trodden on and ruined.

The moth (Fig. 42, *2*, ♀) is of a rusty yellow color inclining to green and marked with pale lilac and white with transparent crescent spots as in the illustration. The males are smaller than the females, having smaller bodies and narrower wings, the hind ones, especially, being much less rounded. The male antennæ are scarcely any broader than those of the female.

The above descriptions are general in their character. The insect is not only variable in intensity of markings and coloration; but likewise, to an unusual degree, in the time required for development. Some of the first ones I bred were very irregular in this respect, part of the second brood issuing as moths in the fall, and part remaining over winter in the cocoon till the middle of the following June. I have also had the chrysalis remain not only through one winter, but throughout the summer and succeeding second winter, and not give forth the moth till the second summer; though the cocoons were submitted to precisely the same conditions under which others, hatched from the same batch of eggs, issued in the fall of the year in which they were hatched. This is the common experience of most persons who have raised the worms in large quantities.

A high temperature generally hastens their development, as it does in other insects; and while my summer broods averaged but 25 days from the time of hatching to spinning, those of the fall brood which issued the same year, averaged 30.

Some specimens which I happened to have feeding in 1869 in cages containing plum twigs as well as ailanthus, seemed to eat the leaves of the former with as much relish as of the latter; and no doubt other food-plants might be found for this insect, if it were desirable. In Europe they have also been fed with success on *Rhus coriaria* and Pimpernel; while Dr. Wallace has fed them with Plum and Laburnum producing moths weakened and

defective in size; and gives a very interesting account of some dwarfs produced from celery fed worms.

BEST METHOD OF RAISING THE WORMS.

As this worm takes so kindly to our climate, there will be no difficulty in rearing it in any quantity in the open air, if only care be taken to protect it from the attacks of birds and predaceous insects such as ants, ground-beetles etc. It does not seem to be palatable to birds, as Dr. Wallace found that none of them touched it in England, except the tom-tit, robin and rook. Consequently, by a little vigilance in keeping away enemies, it may be reared with but slight loss, upon trees without covering. Yet it would be expedient and satisfactory in making an Ailanthery to keep the trees in plantation so trimmed and pruned that an awning of some kind of light material could be stretched over them during the feeding season, and removed and put away during the rest of the year. A few cocoons, well chosen for size and quality, might be left on the trees for breeding purposes, and the moths as they issue would soon pair naturally and the females deposit their eggs upon the branches of the trees. The males show a wonderful power in finding the females, as the following incident will demonstrate. In 1865, knowing that the moths I reared in Chicago were the first that had been introduced there, and that there were no others within hundreds of miles, it occurred to me that an excellent opportunity was offered to test the attractive power of the female; this power being generally very strong in the *Bombycidæ*, and often made use of by entomologists to semble the males of rare species. Accordingly I took a virgin female bred indoors before any out of doors had issued, and after placing her upon a tree where she inclined to remain, went the same evening a full mile away, with the wind, and let loose a male with wings slightly notched so as to be recognizable again. I hardly expected the experiment to result favorably; but sure enough, the next morning the identical male which I had marked was with the female. Two broods can easily be produced each year, and the time of hatching of the eggs, of the issuing of the moths, and that required for the development of the worm, depends so much on the temperature, that the broods can be produced at the seasons most convenient and favorable. When this control is desired, the eggs and the cocoons must be properly managed. The cocoons intended for breeding purposes may be suspended in chaplets so that the moths may issue more readily and have good opportunity to hang their damp wings as they expand. They may then be coupled and placed in wicker boxes or any other well ventilated vessels, from which the eggs, when laid, can be easily removed. The eggs when about to hatch may be fastened to the trees in various ways, so that the young worms, from the first moment of their lives, will find the leaves convenient. They may be pasted on to thin wood, paper or linen, and pinned in small quantities to the leaf-stalk; or portioned into lots of fifties or hundreds and suspended in small muslin bags pinned near a leaf.

The young worms are gregarious and generally remain on the under-

side of the leaves; and as they do not consume much at this period, and are more liable to the attacks of their enemies, it may be found profitable to rear them during the first stage indoors upon cut branches or young trees in pots.

A GOOD WORD FOR THE AILANTHUS.

This tree (*A. glandulosus*), taken from Japan to Europe in 1851, and for a long time supposed to be a sumac and known as the Japan Varnish tree, was first rightly described by the French botanist Desfontaines. It is now grown as a shade tree all over this country and is one of the most valuable, and at the same time worst abused trees we have. A peculiar odor, reminding one of the urine of a male cat, and quite nauseous to many persons, attaches to the staminate flowers, and in a slight degree to the leaves and the rest of the tree. This odor is even faintly communicated to the silkworm which feeds upon it; and is the cause of the prejudice which many have against the tree; it is never disagreeable in the open air, except during the flowering season, and may be entirely avoided by growing only the female or pistillate tree, or by clipping off the blossoms of the staminate tree. The advantages of the Ailanthus so far outbalance this one obnoxious feature that I consider it one of the most valuable shade trees we have. Growing freely in chalky, sandy, or clayey—in the poorest or the richest soil; defiant of city smoke or prolonged drought; wonderfully free from insect injuries; easily propagated by root or seed; a rapid grower, with a graceful semi-tropical appearance—it is quite undeserving of the abuse that has been heaped upon it. Away out on the plains on the Kansas Pacific railroad, where tree-planting is yet an experiment, Mr. R. S. Elliot has had excellent success with it, and I was never more favorably impressed with it than in passing through the thronged streets of New York and Brooklyn last summer. There it was, on every side, presenting its fresh rich foliage to the eye, and giving elegance to the streets where all other trees either failed or looked unhealthy. During the excessive drought of the past year, it held its own in our own city of St. Louis better than all other trees; and when it finally shed its leaves, they formed a welcome and nourishing morsel to the hungry cattle who at that time found little else to browse upon. The female tree may always be secured by root propagation and is not only free from the nauseous odor, but grows more symmetrically than the male, and when laden with its large seed-bunches, tinted with shades of yellow, orange and crimson, it is really beautiful. The Ailanthus is said to impoverish the ground and is supposed to furnish the best food for the worms when grown on a chalky, or limestone soil.

[Fig. 45.]

PROMETHEA MOTH, MALE.

[Fig. 46.]

PROMETHEA MOTH, FEMALE.

THE PROMETHEA SILKWORM—*Attacus* [*Callosamia*] *Promethea*, Drury.

(Lepidoptera, Bombycidæ.)

[Fig. 43]

This is one of our native worms possessing many charac ers which closely ally it to the Cynthia worm. Its cocoon is, like that of the two preceding species, elongate and open at one end. It is also double, but the outer coat is not loose and rough, but smooth and solid like a piece of tough manilla paper; and there is very little space, and consequently very little floss silk between it and the inner coat. The silk is finer, weaker, less in quantity, and much more closely compacted and agglutinated than in the others, and, when coupled with the fact that it is suspended by a rope or cord, as long as, and often longer than, the cocoon itself; these qualities render it less valuable than that of either the Cecropia or Cynthia worms. Indeed, under present conditions, the cocoon of Promethea is valueless, as it cannot be reeled, and I doubt whether it could even be carded.

The Promethea moth lays her eggs on the twigs of the tree which is to supply the worms with food, in clusters of five or six together. They are of the size and form of those of *cynthia*, of a pale cream color, variously shaded with a brown gummy substance, which is often mixed with the hairs of the mother's abdomen. They hatch in the latitude of St. Louis from the middle to the last of June.

LARVAL CHANGES.—The young, in the first stage, is very much like that of *cynthia*, being yellow, with six rows of tubercles; but instead of having two spots to each joint between these tubercles, it has two transverse dorsal black stripes on each joint, the posterior reaching a little further down than the anterior. The tubercles are blunt, thickened at tip, and are white, except on the thoracic and anal joints, where they are tipped with black: they are furnished with long bristles, which are also pale, except on the joints just mentioned. The head is yellow, with two transverse dark bands, the upper one broad and excavated laterally. In the second stage there is no essential change, except that the black tips are confined to the 4 uppermost tubercles on the first, and those on the anal joints; the black stripes are also more conspicuous. In the third stage (Fig. 43, *a*) the body is paler; the transverse stripes are more conspicuous, the bristles on the tubercles are shorter, having more the appearance of spines, and the two uppermost tubercles on joint 2 are often tipped with black. In the fourth stage there is considerable variation, but generally the body is still paler and covered with a whitish pruinescence or powder which recalls the powdery appearance of *cynthia* at the same age; the transverse stripes are broader (Fig. 43, *c*, represents an enlarged side view of one of the joints) and show a tendency to approach between the tubercles; the dorsal rows of tubercles are sulphur-yellow, except on joints 1 and 12, where they are black, and the central yellow tubercle on joint 11 becomes more prominent; the subdorsal row is entirely black, and the stigmatal row is black on the thoracic joints and yellow on the rest; three black ventral tubercles each side of thoracic joints are now often quite conspicuous; the spines correspond in color to the tubercular stalk; the head (Fig. 43 *b*) is yellow, with the lips and triangular piece white, and is prettily marked with black, as follows: two

black spots on frons, one behind antennæ, a stripe around labrum, and one at lower base of cheek: the anal legs are also marked above with a rectangular black stripe. In the fifth stage, *i. e.*, after the fourth moult, the appearance is totally changed: the body is of a most delicate bluish-white, with a faint pruinescence; all the spiny tubercles become smooth, and with the exception of the four dorsal ones on joints 2 and 3 and the large one on joint 11, they are mere rounded,* polished, black or blue-black elevations; the four on joints 2 and 3 are at first yellow, with a black basal annulation, but they soon become red; that on joint 11, which is of the same size, remains yellow with its black base; the rectangular black mark on anals becomes sub-triangular; and the marks on front of head generally disappear. The legs and anal shield are yellowish, the abdominal prolegs having each a black spot outside, while there is often a minute black spot on each side of venter, to correspond with them, on joints 4 and 5. The stigmata are narrow and brown.

As this worm acquires its full growth, the pruinescence, mentioned above disappears, and it acquires a more greenish cast, except around the base of the tubercles where there is a more decided blue annulation. At this time it presents the appearance of Figure 43, *d*. It is quite irregular in developing, but usually acquires its full growth within a month from hatching. In making its cocoon it instinctively fastens to the twig, by woolding around it a strong band or cord of silk, the leaf which it intends to use for the purpose, and connects the leaf with this anchor-band by continuing the silken girdle around the leaf-stalk. In the winter time the leaf-stalk shrinks and rots, so that the cocoon swings either the whole length of its fastening, or but part of its length, as at Figure 44. As may readily be inferred, the length of this fastening depends on the length of the leaf-stalk, and if no leaf-stalk is at hand the worm may form a cocoon without a cord. This insect is single-brooded, and the cocoons hang through the winter and give forth the moths during the end of May and beginning of June. I have known the latter to issue, however, during the same year, but such an occurrence must be considered exceptional.

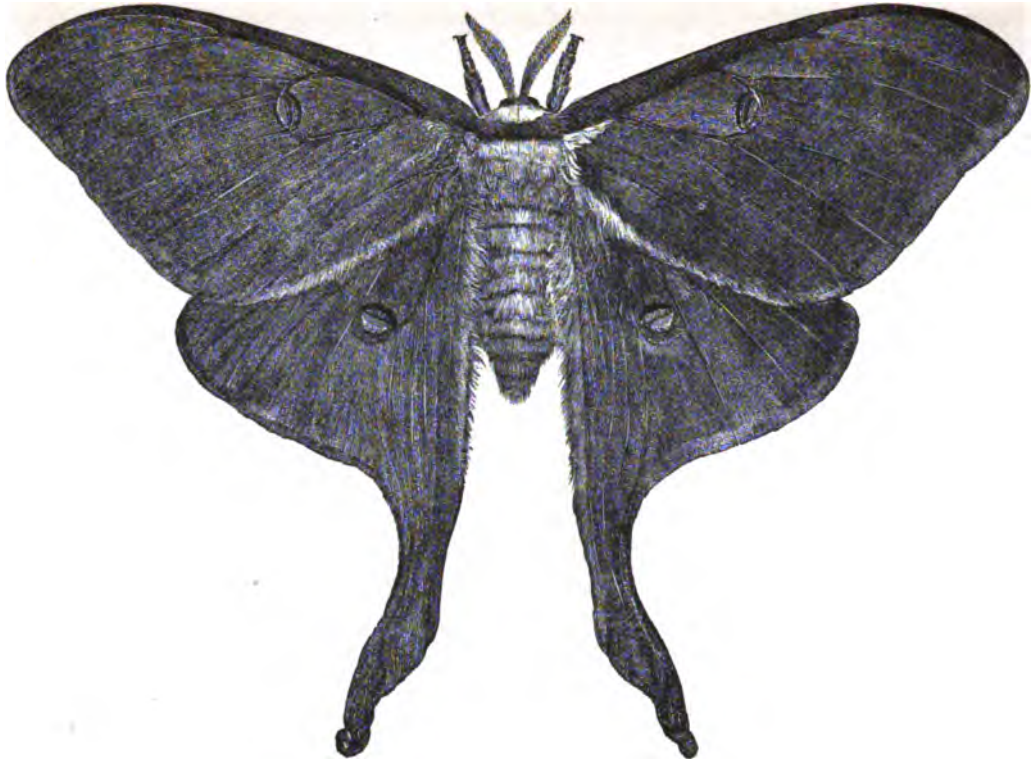
[Fig. 44]

The sexes differ strikingly in appearance. As with *cynthia* the wings of the male are more narrow and more falcate than those of the female, but though the same design is manifest in both sexes, the general color of the male (Fig. 45) is a deep rich smoky or amber-brown; while that of the female (Fig. 46) is of a lighter rust or reddish-brown. Both have a pale wavy line across the middle and a clay-colored border along the hind edges of the wings. Both also have an eye-like black spot with a pale bluish crescent inside, near the tip of front wings; but the female has a pale angular spot, shaded outside with black, near the middle of each wing, which is only occasionally faintly indicated on the underside in the male. The antennæ of the male are about twice as broad as those of the female.†

* Sometimes conical on the back of joints 3 and 12.

† Occasionally specimens are found combining the pattern of the female with the dark colors of the male, and these should be considered either as hermaphrodites or anomalies, But they have been described as a new species under the name of *angulifera* by Mr. Francis Walker of the British Museum. I have seen the specimens under this name in said Museum and in the collection of the Entomological Society of Philadelphia and should not think of considering them anything else than

[Fig. 47.]



LUNA MOTH, FEMALE.

The cocoons are found upon the Ash, Sassafras, Wild cherry, Tulip tree (*Liriodendron,*) Sweet gum (*Liquidambar*), Spice bush (*Lindera*), Maple Plum, Poplar, Azalea, Cephalanthus, Snowdrop tree (*Halesia*), Barberry, Birch, Bayberry (*Myrica*) and Lilac. Of course it does not follow that the worm feeds upon all trees and shrubs upon which its cocoon is found: on the contrary, there is good evidence that it often prefers to wander onto some tree, other than that on which it fed, when about to spin up; and Dr. Fitch (Rep. III, §80) has shown that in New York it spins up by preference on Lilac. But I have fed it successfully on the five trees first mentioned while my correspondents in Pennsylvania and Maryland have fed it on Tulip tree, Sweet gum and Spice bush; and there is reason to believe that it will feed upon the others. In fact Mr. Chas. S. Minot of Boston, Mass., informs me that at a pinch it will feed on Arbor-vitæ. It is most commonly found on Sassafras and Cherry with us, while singularly enough, Dr. Fitch has shown that in his locality, it prefers the Ash, and does not touch Sassafras even when adjoining Ash. These facts go to show how a species may get to prefer different trees in different sections of a country, and indicate how incipient races at first, and in time varieties and species may be formed.

NATURAL ENEMIES.

The cocoons are often gutted by birds, hard pushed for food in the winter; while the worm is attacked by several parasites. The cocoon is often found to contain numerous other small silken cocoons, very much as represented in Figure 40, but formed of a somewhat darker material; and from these I have bred *Cryptus nuncius*, Say which differs principally from *extrematis*, Cresson, in having the ovipositor shorter than the abdomen as in Figure 41, *b*; instead of nearly twice as long as at *a**. *Chalcis mariæ* also preys upon it, and Mrs. Chas. S. Minot has bred an *Ichneumon*, an *Ophion* and a *Tachina*-fly from it.

THE LUNA SILKWORM—*Attacus* [*Actias*] *Luna*, Linn.

(Lepidoptera, Bombycidæ.)

Whichever of the preceding moths may carry off the palm of beauty in the eyes of different persons, no one will hesitate for a moment to accord to *Luna*, our "queen of the night," entire supremacy in grace, elegance and chasteness. No other N. A. insect can win this distinction from her. All the large moths figured in this article on silkworms draw forth expressions of admiration from those who see them in my cabinet; but the delicate green, relieved by the eye-spots and by the broad purple-brown or lilaceous anterior border; the soft downy hair of the body, and above all the graceful

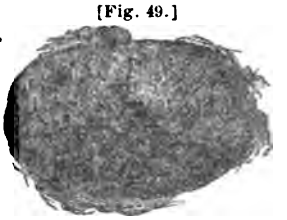
varieties of *Promeih a*. From the fact that this exceptional form has been reared from cocoons spun up around the base of trees, I infer that it is often produced from enfeebled worms which have fallen to the ground.

*For further details see page 111.

prolongation of the hind wings (See Fig. 47) of *Luna*, are the first to attract the eye. The green varies in tint, having either a cold, bluish, almost pearly look, or being strongly suffused with yellow. The body is sometimes pure white but more generally yellowish or cream-colored, and though the hind borders of the wings are usually yellowish, they are sometimes stained with the same deep color as the anterior or costal border.

[Fig. 48.]

[Fig. 49.]



The cocoon of this insect (Fig. 49) is formed within a leaf, or leaves drawn together, and in the fall of the year drops to the ground where it remains all through the winter. It is whitish or brownish*, closely spun, tough, oval and closed at each end; but it is so thin and contains so little silk, that it cannot be unwound and possesses no value compared with some of the others.

The eggs are deposited in small batches on the twigs: they are slightly larger than those of *cynthia*, and more or less deeply colored with a brown adhesive fluid.

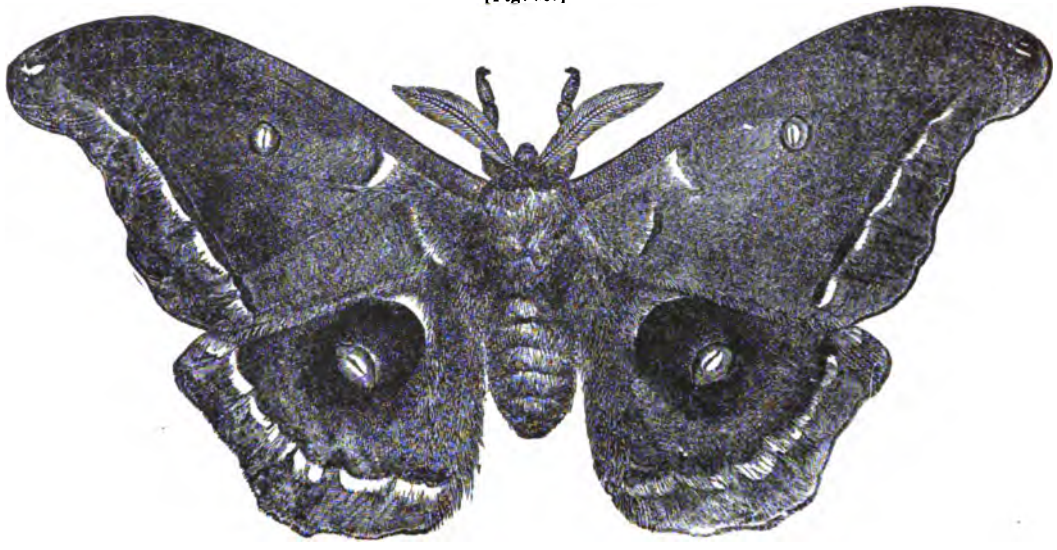
The worm feeds with us principally on Walnut and Hickory; but is also found on Sweet gum, Beech, Birch, and even Willow and Plum.

Larval Changes.—In the first stage the worm is of a pale green color, with two brown transverse bands across the head something as in Figure 43, *b*, and a brown longitudinal mark along each side of the body, especially distinct on the four anterior joints and sometimes meeting on the back of the 4th. It is covered with setaceous tubercles, placed in precisely the same position, and of the same size, as those of *Cecropia*, *Promethea* and the others at the same age, the stiff hairs being mostly tinged with brown. In the second stage the brown marks on the head mostly remain, but often are less distinct; the lateral brown stripes vanish and the four dorsal tubercles on joint 1, the two uppermost tubercles on joints 2 and 3 and the middle one on joint 11 are generally orange-red. In the third stage there is very little change; the upper band on the head usually disappears entirely, the tubercles become uniform in color again, and some of the bristles become more conspicuously black and more spinous. In the fourth stage, the tubercles are reduced in relative size, especially the subdorsal row. In the fifth stage these tubercles become relatively still smaller, and some few other changes take place. The full grown larva (Fig. 48) almost equals the parent moth in delicacy of color, being of a remarkably clear pale green inclining to yellowish above and bluish below. The sides slope, roof-fashion, from the spiracles to the back, which is comparatively narrow, and where the sutures are very deep, causing each joint to form a sort of tubercle having a crescent shaped indenture, and reminding one of those on the back of some of our wood-borers such as the Round-headed Apple-tree Borer. There is a longitudinal substigmatal yellow line each side, and a transverse yellow line on the posterior edge of the 4th to the 10th joints inclusive. The tubercles are vermillion-red, the lower ones darkest, the upper ones verging on to orange; and on joints 2—5 there is an additional ventral tubercle each side. The spiracles are deep reddish-brown: the head is bluish-green shaded above with light brown, and at sides with darker brown†: the upper lip is produced into two appendicles more prominent than in any of the species yet described and serving no doubt to steady the leaf which the worm is gnawing. The cervical shield is horny, with a tinge of blue. The thoracic legs are brown with yellow at base, and the prolegs light brown with a black outer line just above the coronet of hooks. The caudal plate is narrow, bluish, with brown edges and bordered

* Doubtless according to food-plant. Specimens fed on Hickory have given me the darker cocoons

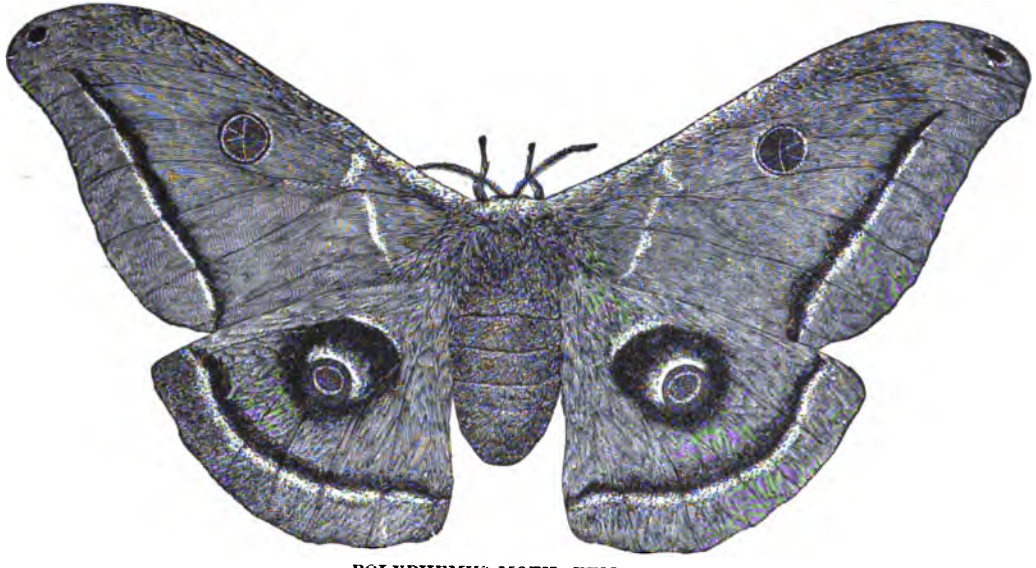
† Exceptional specimens occur with the head and thoracic legs almost black.

[Fig. 50.]



POLYPHEMUS MOTH, MALE.

[Fig. 51.]



POLYPHEMUS MOTH, FEMALE.

above with yellow, and there are plates on the anal legs of nearly the same size, form and color. The whole body is sparsely covered with short yellowish bristles, aside from the few longer ones which emanate from each tubercle.

The moths issue during the month of April up to about the middle of May. The worm acquires its full growth in about a month from the time of hatching, and goes through the eariler moults quite rapidly. In a state of confinement the moths from these first worms have always issued in July near St. Louis, and it is quite probable that the insect is frequently 2-brooded with us though considered single-brooded further north.

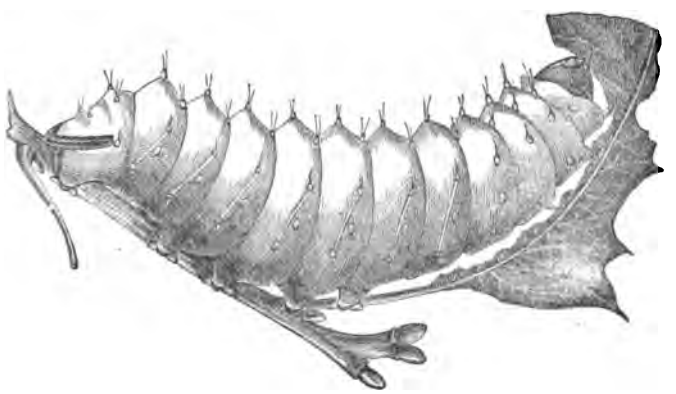
I have never known this insect to be parasitized, but Mr. V. T. Chambers, of Covington, Ky., has know a *Tachina*-fly to deposit eggs upon the worm, without, however, preventing its maturing to the moth.

There is a moth occurring in China (*A. Selene,* Leach) which must, I believe, be considered identical with our *Luna,* or at the most should be considered only as a variety. Dr. Fitch has minutely described such differences as are supposed to separate the two as species.*

THE POLYPHEMUS SILKWORM—*Attacus* [*Telea*] *Polyphemus,* Linn.

(Lepidoptera, Bombycidæ.)

[Fig. 52.]



This is the insect which, as I have already remarked, has been styled, with much justice, "the American Silkworm" by Mr. L. Trouvelot, of Medford, Mass. That gentleman made a series of very interesting experiments in rearing the worm in large quantities in the open air, and in 1865 he had not less than a million feeding upon bushes covered with a net. An interesting account of these experiments, but more especially of the natural history of the species may be found in the first three numbers of that excellent periodical the *American Naturalist.*

The eggs of Polyphemus are deposited singly, or in twos or threes, on the under side of a leaf or upon a twig; and as a further instance of the fallibility of instinct, Mr. Trouvelot has known them to be deposited in the open air upon plants which could not nourish the young worms. They are of about the same size of those of Cecropia, less oval—the lateral cir-

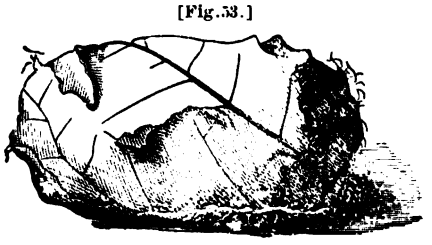
*3rd N. Y. Rep., § 180. Note.

cumference being nearly cylindrical—and more flattened. They are whitish, inclining to flesh color on the top and bottom, and encircled on the sides by a characteristic broad band of amber-brown, which is the natural coloring of the egg-shell and distinct from the brown fluid which is secreted with and fastens them to whatever object they are consigned. This brown band has a narrow pale spot at the two smaller ends. The moths issue with us the latter part of April, or in May, and the female commences depositing very soon afterwards. The eggs hatch in about ten days after deposition.

The worm feeds on Oak, Walnut, Hickory, Bass-wood (*Tilia*), Elm, Maple, Hazel, Apple, Rose, Quince, Thorn, Plum, Choke cherry, Sycamore, Poplar, Birch, Honey locust, Blueberry and Willow; on the first nine of which I have found it myself. It has the general form of that of Luna, though the sides are not so sloping nor the incisions so deep. When full-grown (Fig. 52) it is a most delicate and beautiful object, being of a clear apple-green color, with oblique yellow lateral lines, and tubercles tinselled with orange, gold and silver. The head, spiracles, legs and ends of prolegs are of a buff-yellow, the front edge of the first joint sulphur-yellow, and the dges of the anal shield purple.

LARVAL CHANGES.—In the first stage the larva is yellow, becoming greener in appearance as it increases in size. The tubercles are situated as in the other species and are yellow, capped with a whorl of rufous bristles. The two dorsal rows are large, conspicuous, and except on joint 11 uniform in size. In the subdorsal row they are large on the thoracic and 12th joints, but almost obsolete on the rest. In the stigmatal row they are small and of equal size. Each joint has two transverse black lines between the subdorsal and the stigmatal rows of tubercles: the head is reddish-brown, and there is a transverse line of the same color on the first joint. In the second stage it is of a beautiful green; the tubercles are of the same relative size, those on the back having a length of ¼ the diameter of the body; they are thick and slightly bell-shaped, green at base, yellow in the middle, and orange-red at tip, with the bristles or spines mostly black. Only one of the black lines remains to each joint and that is very faint, contains the spiracles, and is shaded with paler green behind. The head and cervical shield are of a deeper red-brown and the anal plate is edged with pearly whitish-green. In the third stage there is little change: the tips of the tubercles deepen into coral-red; the subdorsal row becomes almost as conspicuous as the stigmatal, and there is no longer any black lines between them, though the spiracles are now quite black and well relieved by pale green behind. In the fourth stage the tubercles are relatively smaller, the head is of a still deeper purple-brown, with the front edge of first joint, and the lateral oblique line, which is now more distinct, of a delicate sulphur-yellow; the spiracles are deep brown, and the edge of the anal plate is silvery-white below, graduating into lilaceous and then into deep purple above. As it approaches the fourth moult, the tubercles acquire a metalic, or silvery cast, and the other colors deepen. In the fifth stage the seven oblique lines, connecting the subdorsal with the stigmatal tubercles on joints 5—11 are bright sulphur-yellow, the tubercles appear tinselled and reflect golden, silver and purple hues: the dorsal rows give forth but two or three straw-colored bristles, and the subdorsal rows but one of the same color, all pointing upward and forward; while the stigmatal row produces one light and one dark one which point exactly in the opposite direction. Numerous other stiff hairs spring directly from the skin, especially below; the subventral thoracic tubercles are conspicuous; and there is a faint longitudal ventral band. The front edge of the first joint is bright sulphur-yellow, with a soft retractile band of slate color between it and the head.

[Fig. 53.]

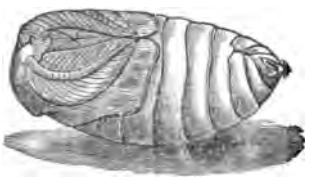


The cocoon (Fig. 53) is formed of strong silk which when unwound has a glossy fibre. It is oval and closed at both ends, dense and generally fastened to a leaf or leaves, with which it falls to the ground, though sometimes it is fastened to twigs and therefore remains exposed during the winter, to

its enemies. This cocoon is said by Fitch to so closely resemble that of Luna, that the two cannot be distinguished from each other, and Harris speaks of their great similarity: but with us they are very easily distinguished. That of Polyphemus is not only more dense, but its fibres are intermixed and cemented with a gummy substance which when dry gives the cocoon a hard chalky appearance. This hardness renders the exit of the moth unusually tedious and difficult, and the process has been so well described by Mr. Trouvelot, that though I have watched it myself, I repeat his words:

"But the moth must have some means of exit from the cocoon. In fact it is provided with two glands opening into the mouth, which secrete during the last few days of the pupa state, a fluid which is a dissolvent for the gum so firmly uniting the fibres of the cocoon, This liquid is composed in great part of bombycic acid. When the insect has accomplished the work of transformation which is going on under the pupa skin, it manifests a great activity, and soon the chrysalis covering (Fig. 54) bursts open longitudinally upon the thorax; the head and legs are soon disengaged, and the acid fluid flows from the mouth wetting the inside of the cocoon. The process of exclusion from the cocoon lasts for as much as half an hour. The insect seems to be instinctively aware that some time is required to dissolve the gum, as it does not at first make any attempt to open the fibres, but seems to wait with patience this event. When the liquid has fully penetrated the cocoon, the pupa contracts its body; and pressing the hinder end, which is furnished with little hooks, against the inside of the cocoon, forcibly extends its body; at the same time the head pushes hard upon the fibres and a little swelling is observed on the outside. These contractions and extensions of the body are repeated many times, and more fluid is added to soften the gum, until under the efforts the cocoon swells, and finally the fibres separate, and out comes the head of the moth. In an instant the legs are thrust out, and then the whole body appears; not a fibre has been broken, they have only been separated.*

[Fig. 54.]



"To observe these phenomena, I had cut open with a razor, a small portion of a cocoon in which was a living chrysalis nearly ready to transform. The opening made was covered with a piece of mica, of the same shape as the aperture, and fixed to the cocoon with mastic so as to make it solid and airtight; through the transparent mica I could see the movements of the chrysalis perfectly well."

Mr. Trouvelot also gives some very interesting facts to show the wonderful vitality of the chrysalis. He once thrust a pin through a cocoon which he wished to preserve, and, as might be supposed, the pin also pierced through the body of the chysalis inside. This was done in October, and nine months afterwards, in June of the following year, he was surprised to find a great commotion in the cabinet where the specimen was pinned, and

* As I have already intimated (p. 74) this statement is not sufficiently guarded.

the moth with head and legs projecting, endeavoring in vain to escape from its prison. To prove also that no air is needed from outside for the proper development of the moth, he carefully covered cocoons so as to make them air-tight and kept them so covered all winter without in the least affecting the exit of the moth.

The moth (Fig. 50 ♂; Fig. 51 ♀) is of a dull ochre-yellow, shaded more or less distinctly with innumerable black particles and with a broad gray band along the front, or costal edge, and passing over the thorax. There is a darker, reddish-brown shade across the middle of the wings, and near this shade on each wing is a transparent eye-like spot, divided by a slender opaque line, and margined by a yellow and a black ring, the last much broader on the hind than on the front wings, being there widened on the inside into a large black spot with the part adjoining the eye-spot bluish-white. Near the hind margin of each wing is a dusky band, (bluish on the front ones) edged with pink-white behind; and near the base of the front wings is a zig-zag crimson line, edged inside with white. There is great variation in the colors of this insect, dependent in some measure no doubt on the food of the larva; and it is a wonder that some of them have not been described as distinct species by those who consider *Callosamia angulifera* or *Samia Columbia* good species. Specimens occur which have the general tint either very dark or very pale; either brown, smoky-yellow, cream-color, rust-red or greenish; while the large black spot on the hind wings is sometimes replaced by rust-red.

The male is easily distinguished from the female by his smaller abdomen, and very broad antennæ which are, in fact, broader than represented in my figure, as I have known them to spread nearly half an inch. They have actually been mistaken for a third pair of wings by inexperienced persons, and my friend, M. Provancher, gives the following amusing account of such a mistake in the *Naturaliste Canadien*, which he edits: *

We must *look* in order to *see;* and in Natural History perhaps, more than in any other department of knowledge, we must know *how* to look, in order not to be deceived in our observations. One day one of our worthy neighbors came to call upon us with a very self satisfied air. "Oh, Sir," says he, "I can show you—you who are so fond of rare things—an insect such as you have certainly never seen." "Take care: my collection is pretty large." "I have seen your collection and you have nothing like it. It is a butterfly with six wings!" "A butterfly with six wings?" "Yes, sir, with six wings. Besides the four wings in the ordinary places, it has two little ones in addition on its head. It has a body as stout as that of a middling-sized mouse, and two large eyes in its hind wings. All those to whom I have shown it say they have never seen anything like it. But what is most extraordinary about it is these little wings on its head. What can be the use of them?" Recognizing without trouble by means of this description the insect that was referred to, we replied: "You know that butterflies are travelers, or rather navigators, in the air. Ordinarily they have only four wings, which, if you please, we may liken to the mainsails and topsails of our common sloops or cutters. Probably your butterfly, having a longer voyage than usual to make, has found it advantageous to

* Vol. 1, p. 22.

add a foresail; and I should not be at all surprised if some other one took it into his head, to hoist a jib ahead of his other sails, so as to be still more complete. But in the meantime let us go and see how yours is rigged out." Our friend, who had received our raillery with a self-satisfied air, because he believed that he should soon have his revenge, by the stupefaction into which we should be thrown by the sight of his wonderful phenomenon, was quite put out of countenance when, at the first glance that we threw upon his insect, we recognized the male of our Polyphemus Moth, and invited him to come and see five or six others just like it in our collection. He had mistaken for wings the feathered antennæ of that magnificent moth, which are especially well developed in the male sex, and which he had not taken the trouble to remark in the specimens in our cabinet. But far from wishing to turn aside our young naturalist from his observations, in consequence of this unfortunate result of his first attempt, we made him faithfully promise to examine well all these little beings which are every day presenting themselves before our eyes; assuring him that, although he would never find insects with wings on their heads, he would nevertheless find other wonderful things that would interest him still more.

We repeat the same advice to all our readers. Look! observe! examine! and you will see wonders without number unfold themselves before your eyes.

It is a rule, without exception, that no insect has more than four true wings. The wings may be split up as in the Plumes, of which the Grapevine Plume (Rep. 3, Fig. 27) is an example; or they may be furnished with a membranous lobe as in the European genus *Lobophora;* but they never are increased in number beyond four.

The principal difficulty in the way of reeling the cocoon of Polyphemus is the hard matter which binds it; but it is not an insurmountable one, and the cocoon could no doubt be improved by a proper process of continued selection. The silk, as already stated, is strong and lustrous.

As with some of the other species already mentioned, two broods of this insect are frequently produced each year in this latitude, though it normally appears to be single-brooded in the more northern States. In the South it is always double-brooded, the first moths issuing about the middle of February in Louisiana. If it is ever grown for silk the South will be the most favorable part of the country, for it often abounds in New Orleans in such numbers, on Sycamore, Elm, and live Oak—especially the latter—as to be easily gathered by bushels.

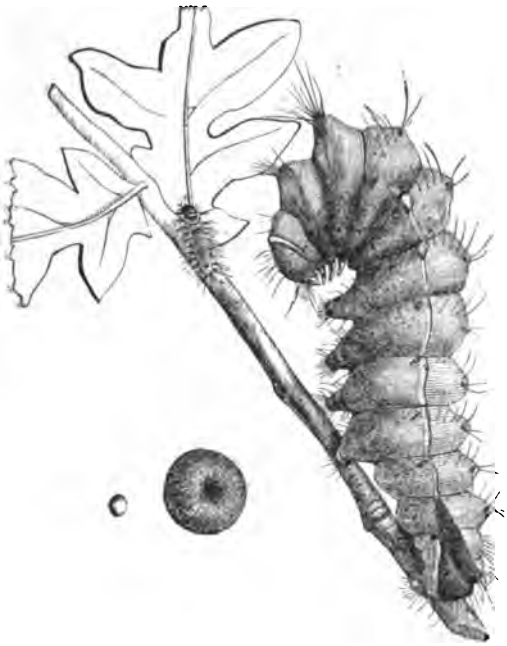
The parasites of Polyphemus are, the Mary Chalcis-fly (Fig. 39), the Long-tailed Ophion (Fig. 37) and a Tachina-fly which I shall not now describe for reasons given in my 3rd Report (p. 150). It differs from that which I have bred from Cecropia, principally in its gray color being less bluish, and in having smooth eyes; and may be provisionally designated as *Tachina anonyma.**

* It belongs, apparently, to Macquart's genus *Masicera*. I have bred precisely the same species from *Citheronia regalis*, and others that differ only in being smaller, from *Prodenia autumnalis*, an undescribed Noctuan, *Cynthia cardui*, *Heliothis armigera*, *Datana ministra*, and *Danais archippus;* while I have others from *Sphinx carolina* which differ only in having the apical joint of abdomen rufous. The face appears quite golden on the top and the second and sometimes the third abdominal joints incline to rufous at sides.

THE YAMA-MAÏ SILKWORM—*Attacus* [*Antheræa*] *yama-maï*, Guér.-Mèn.

(Lepidoptera, Bombycidæ.)

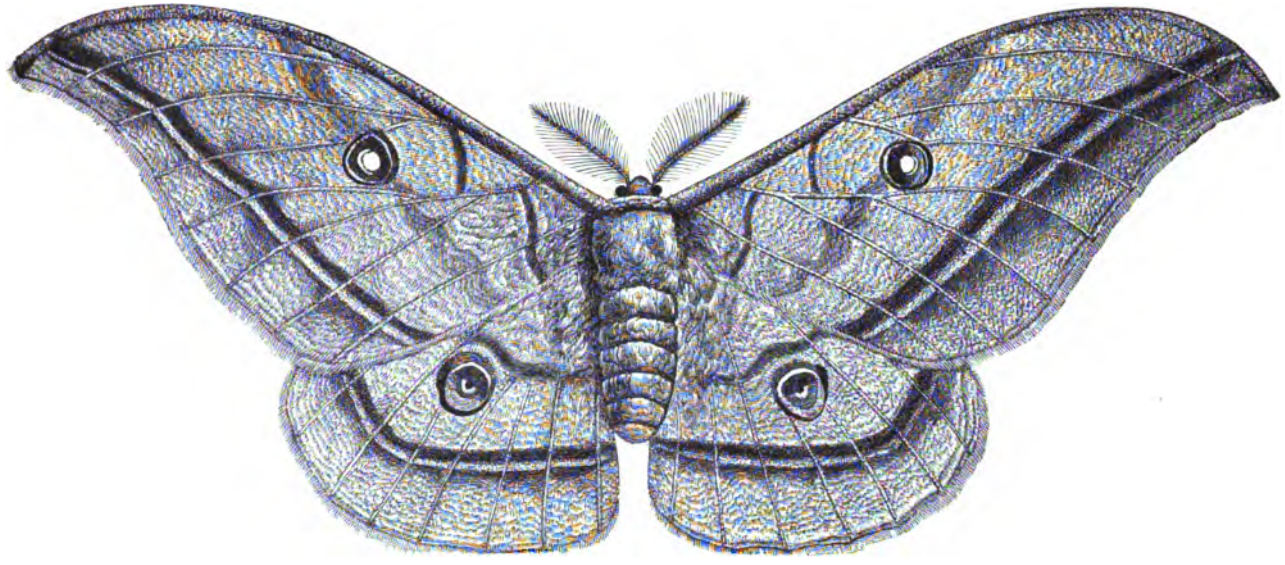
[Fig. 36.]



This worm is a native of the northern parts of Japan, living, as its name (meaning "worm of the mountains") implies, in the mountainous districts. It feeds on a species of Oak known botanically as *Quercus serrata*, and called Kunogi by the natives. Its silk is produced in large quantities in its native country and already forms an article of export. It was first introduced into Europe in 1861 and soon afterwards named and described by Guérin-Méneville.* It has been found more difficult to acclimatize than the Ailanthus worm, and but indifferent success has attended its culture. Yet there are striking exceptions, and in Austria it has been successfully reared in considerable quantities for several years. It is withal so valuable an insect that further trial is fully justified. In America it has been experimented with only since 1868, and I have for two years attempted to raise it in small quantities in Missouri. In 1869, the weather was quite unfavorable, and from two dozen eggs I failed to obtain any moths though most of the worms passed through the third moult. The eggs hatched prematurely and I had to feed the young worms on crushed buds. The disease they died of was similar to one which attacks them in their native country, and which has also been noticed in Europe. I am very much inclined to attribute it to excessive heat. The worms become speckled and blotched, the beautiful clear green changes to dull yellow, diarrhœa ensues, the body hangs by the prolegs, a flaccid shapeless mass of putrid fluid which soon bursts through its tender and rotten covering, and finally leaves nothing but a dry shrunken skin. In 1870 I had a little better luck with a second two dozen, though nearly one-half hatched before food could be obtained for them, and consequently died, and only one went through all its transformations and pro-

* For details of the history of this worm, and its culture in Europe, the reader may refer more especially to the following works: Different papers by Guérin-Méneville in the *Revue et Magazin de Zoologie*, and *Revue de Sericiculture* for the years 1861–3. *Le ver a Soie du Chene* (*Bombyx Yama-mai*) *son histoire, sa description, ses mœurs*, by M. Camille Personnat. *Rapport sur une education en Anjou du ver du Chene* (1863) by F. Blain. Also two essays by Alexander Wallace, M. D., one published in the Transactions of the London Entomological Society (Vol. V, Part V, 1867) and one in separate form in 1869.

[Fig. 55.]

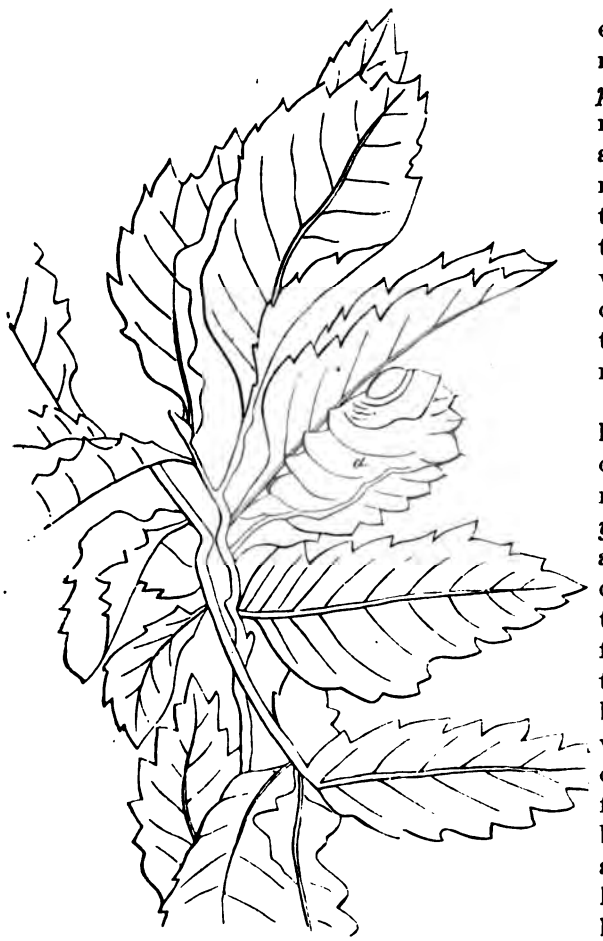


YAMA-MAÏ MOTH, MALE.

duced a beautiful male moth. This specimen was hatched on the 13th of April, commenced spinning June 3rd and produced the moth September 8th —thus requiring the unusually long period of nearly five months for its changes.

Mr. W. V. Andrews, of New York, who has taken great interest in the introduction of foreign silkworms, gives me the encouraging information that last summer, nearly 800 cocoons were obtained from about 1600 eggs, in the vicinity of New York. The moths issued at such irregular intervals, however, and were so scattered among different experimenters, that no fertile eggs were produced.

[Fig. 57.]



Yama-mai undoubtedly belongs to the same natural genus as *Polyphemus*, which it closely resembles in habit and appearance. Its culture may be carried on in the same manner as that of *cynthia*, and it will suffice here to point out such of its peculiarities as will guide in its management.

The egg is rather larger (Fig. 56 shows it of natural size and magnified) than that of *Polyphemus*, less flattened and of a pale straw-color with a pinkish tint. It appears brown from being more or less thickly coated with a brown tenacious gum, which may be washed off by any alkaline fluid. The eggs should be kept over winter in a temperature never higher than 40° F. When hatching they should be moistened or kept in a moist atmosphere. As in the case of our American Tent-caterpillar, the young larva is fully developed within a month after the deposition of the egg, and passes the winter in a curled-up, quiescent state within the egg-shell.

The worm thrives best in an atmosphere that is cool, moist and shady,

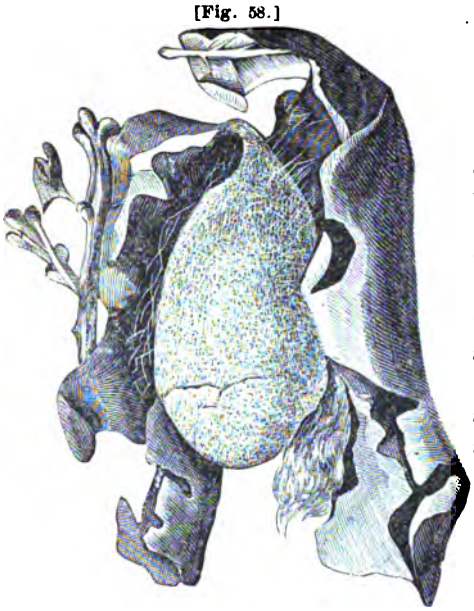
and the heat, if it can be controlled, should not exceed 80° F. It is a lazy slothful creature, and often rests for hours in the position given in Figure 56. As we learn from Mr. F. O. Adams, who has lately made an interesting report on the culture of this species,* the color of the more mature worms so thoroughly corresponds with that of the leaf on which they naturally feed that they can with difficulty be detected while clinging, motionless, to the branches and leaf-stems. They are of a beautiful clear green with generally two silvery spots each side on the fifth and sixth joints, and a pale yellow line running along the sides. This line, with the position which the worm sometimes assumes, strengthens the resemblance to the leaf, and I reproduce a rough outline (Fig. 57) from Mr. Adams' Report which will well convey this resemblance to the reader's mind—the worm being outlined at *a*.

The life of the worm lasts from 50 to 80 days, and it feeds on all kinds of Oak, but prefers those of the white oak group. Dr. Alexander Wallace, of Colchester, England, to whom I am indebted for specimens of the moth, and who has extensively experimented with it, found that the worm would feed also on Beech, Apple, Quince, White thorn, Neapolitan medlar (*Photinia glabra*) and Chesnut.

LARVAL CHANGES.—The larva in the first stage is yellow with tubercles corresponding exactly in number and position with those of *Polyphemus*, and the others described at the same age. It has a narrow, but distinct, dorsal, subdorsal and stigmatal black line. The four upper rows of tubercles, (except the two dorsal ones on joint 8, and the central one on jt. 11, which are large and dark) are yellow and give rise to stout black outwardly-curving bristles; the stigmatal row is black with a white basal annulation, and gives rise to white bristles. The bristles are longest on thoracic joints, and are all white on the first. Head shiny gum-copal yellow; cervical shield paler, more orange and without polish; a black spot on anal shield and on each anal proleg. Thoracic legs black with yellow extremities; prolegs with brown extremities. Approaching the first moult, the yellow color becomes more greenish. In the second stage the color of body is greener, the head is chesnut-brown, the longitudinal lines are almost obliterated, the medio-dorsal one being of a faint and delicate blue: there is a broad lateral band of the same faint blue, with a light yellowish line below it. The tubercles are longer, especially on joints 2, 3 and 4, the dorsal rows of a delicate yellow, the lower one of a delicate blue with yellowish base. The bristles from all are black with a few scattering pale ones. The anal shield is edged with blue. In the third stage there is not much change; the tubercles are relatively still more prominent, the lateral ones tipped only with blue, the green of the body is more intense, and is speckled with straw-color; and the lateral yellow line is suppressed on the thoracic joints. In the fourth stage the change is slight, but from one to three silvery spots appear on the lateral yellow line, usually on joints 5, 6 and 7. In the fifth or last stage, and when full grown, it presents a most beautiful and delicate appearance, but varies considerably, and the following description is taken from those I fed, and more especially from that which produced the male moth. It is of the same form as *Luna* and *Polyphemus*, the joints being deeply insected, narrowing from stigmata upwards, and flattened on dorsum by a crescent-shaped depression. Head opaque green with slight bluish tint, the five ocelli distinct and brown; a few pale hairs especially around, and decurved over, the trophi; antennæ with bulbus yellow, the other two joints brown, the last terminating in a long seta; epistoma with sutures and margins pale lilaceous; labrum very large, with pale margins. Cervical shield paler than body, only slightly polished, ridged behind, and edged in front with yellow. Body clear yellowish-green; tergum of joints (5—10 especially) paler, and almost nacreous at insections; studded with minute (0.02 inch long) short, clavate, sulphur-yellow projections or scales: the tubercles are blue and emit black hairs, and there are besides about half-a-dozen long yellow dorsal, anteriorly-curving setæ on joints 4—11; joint 1 is small and retractile, 2 and 3 large and rendered square by the prominence of the dorsal tubercles; 5—9 subequal; 9—last diminishing; a lateral pale yellow line, faintly edged above with lilaceous, extends from middle of joint 4 to tip of anal legs; a silvery spot in this band on joint 5, and sometimes on joints 4 and 6. Stigmata immediately below the yellow line, slightly oblique, sub-elliptical, fulvous, with (except on joint 1) a brown fringe; a broad triangular brown patch on anal prolegs, and a broad margin on the caudal plate, extending and diminishing to anterior part of joint 11, also purple-brown.

*3rd Rep. on Silk-culture in Japan, p. 8.

[Fig. 58.]



The cocoon (Fig. 58) is large, heavy and handsome, and requires a full week for its completion. It is formed within a single leaf or within several drawn together and attached to a twig. It is oval and usually of a bright golden-yellow color on the outside though nearly white inside. Those raised out-of-doors are more green, while those raised in-doors are more yellow, and white specimens have already been produced. The silk is strong and valuable; it bleaches well and may then be dyed; fewer threads are required to make a strand than in that of *mori*, and it unwinds with perfect facility, by the ordinary process. It shows its affinity to that of our *Polyphemus* by the gum which surrounds it containing a chalky or calcareous substance which may be noticed upon tearing or rubbing the cocoon.

The Moth (Fig. 55, male) is magnificent in point of size and color. The front wings are broadly falcate and more so in the male than in the female. The collar and broad costal margin are always of an ash-gray. The eye-spots are surrounded with more or less pink and yellow, white and black, the black always being on the outside. The broad lines across the wings are either wavy and slate-colored, with an inner wavy coincident shade, or more straight with a whitish outer shade, relieved by a darker more reddish posterior shade. The posterior margins are either paler than the general surface, or ornamented with a dark wavy line. The median shade across front wings is either very distinct and scolloped, or obsolete; and there is either one or two such shades on the hind wings. The species varies, in fact, very much in the detail of ornamentation, and in general color, being either yellow, brown, grayish or olivaceous, and some specimens much resembling certain forms of our Polyphemus.

According to the testimony of those who have had most experience with this species in Europe, coition invariably takes place at night, and lasts but a comparatively brief time. As the moths issue very irregularly and the males are apt to appear many days before the females, and as it has been further ascertained that unless they emerge within a day or so of each other, the sexes show little affinity; it is best to retard the male cocoons. This can be done by first separating them, by weighing as described on page 97, and keeping the male cocoons in a cooler place than those of the female

From the foregoing it is evident that while *yama-mai* is the most valuable silk producer next to *mori*, it is nevertheless very difficult to rear. It

cannot well endure a heat beyond 80° F., and will doubtless thrive best in the more northern States, for it will bear a moderate amount of cold, even below freezing point, for brief periods, with impunity. It is invariably single-brooded, and runs a longer course of life than any of the other species treated of. The hatching of the eggs must be retarded till the first oak leaves (the buds of the Post oak are among the earliest to swell, but some species of the black oak group, especially the Laurel-leaved oak, leaf out first) put forth, and moisture, which is prejudicial to the Mulberry silk-worm, is grateful to this one at all times. I have already said that the embryo larva is fully formed soon after the egg is deposited. Now all our eggs, so far, have been obtained indirectly from Japan *via* Europe, and in the transit they must necessarily be subjected to too much dampness and confinement, too great changes from heat to cold, and the reverse; and the vitality of the young worm thus impaired. Mr. Androws * believes that to this fact must be attributed much of our failure in this country, and I fully concur with him. In this country which, compared with Europe, is so rich in oaks, and in the large silk-producing insects so closely allied to *yama-mai*, and which is so varied in climate, we certainly ought to meet with better success than our European friends; and until we procure eggs more directly, or obtain them from insects reared in this country, so as to preserve them in uniform and favorable conditions, it cannot be said that we have taken the proper steps towards acclimatizing it. Let us hope that friend Glover will induce Minister Capron to send direct from Japan a good supply of eggs, next winter, to experiment with!

Before concluding my notice of this insect I will transfer from the third Report of Mr. F. O. Adams, already alluded to, the following excellent account of rearing it in Japan, which will be found valuable and interesting in this connection:.

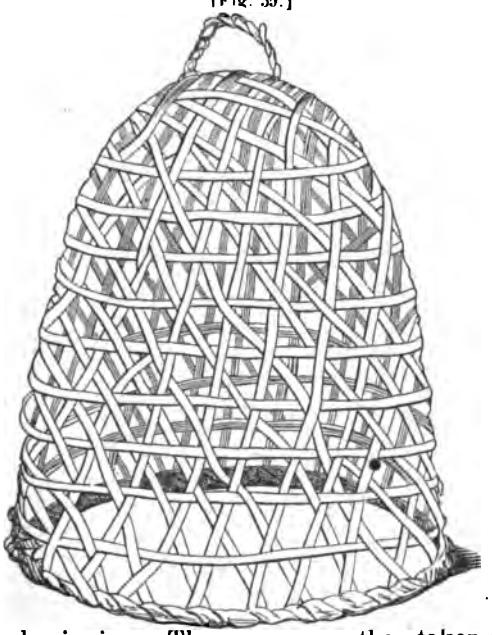
The eggs of the Yama-mai are deposited by the female on the bars of cages made of plaited bamboo strips, of the bell-like form delineated in the sketch (Fig. 59). This is probably towards the end of July, and the cages are hung up one under the other, in rows of ten, under the eaves of the roof where ventilation can be secured without exposure to sun, rain, or smoke.

In the 10th month (November-December) it is generally the custom to take the eggs off the cages with the fingers, and place them in hempen trays of oblong form, with wooden rims about three inches high. Care must be observed that the eggs are not crowded one upon another. The trays are placed upon the verandah. A cold atmosphere is essential at this stage. Sometimes the eggs are not detached from the cages, and the latter are placed in a shed outside the houses, where good ventilation can be secured. The walls of the shed are formed of a coarse matting composed of reeds, and the roofs should be constructed of such material that no rain can penetrate inside and injure the eggs. About the end of the 2nd Japanese month (say the beginning of April) the eggs are collected in small hempen bags, which are placed in boxes pierced with holes, in order to admit of proper ventilation. These boxes are either suspended out-of-doors amongst the trees where no sun can reach them, or kept in a cold cellar, where they are put into deep holes dug in the ground. This operation is only necessary when the hatching has to be retarded, because the buds of the Kunogi have

* *Scientific American*, March 18th, 1871.

not come out. The eggs, in short, have to wait for the buds, which are expected about the 88th day after the Japanese new year, (say at the end of April or in the first ten days of May), though they may be much later. As soon, however, as the buds have come out, all the eggs, whether from outside or from the cellar, are brought into the house, and fixed with paste made of barley, or still better, of buck-wheat, on the middle of slips of paper five inches long and a quarter of an inch broad. About ten eggs are placed upon each paper, and all the slips are then taken to the plantation and tied to the branches of the Kunogi in a single knot, which the nature of Japanese paper readily admits of, the two ends standing out at right angles to the branch. The paper thus surrounds a small section of the tree, the eggs lying on the external surface. The slips are placed in such manner that the eggs may have a northern aspect, and not be exposed to the rays of the sun. One slip is sufficient for a small plant, two or three may be attached to a large one. In four or five days the hatching will commence, and it continues for five or six days more; the young caterpillars, on leaving the shells, immediately crawl from the papers upon Kunogi, and seek the leaves. We saw a number of these papers still remaining on the trees as they had been tied before the hatching, with the empty shells sticking to the surfaces, and we untied some and brought them away with us as specimens.

[Fig. 39.]



The length of time between hatching and spinning, during the whole of which the larvæ remain in the open air, passing through four periods of rest, is reckoned at about 60 days, more or less, according to the temperature. We were told that the first rest commenced on the seventh day, and continued for two days, that the succeeding three periods of activity and torpor were severally longer than the first, and that the spinning commenced about ten or eleven days after the fourth rest.

Three days after the commencement of spinning, said our informants, the hinder part of the cocoon is seen to be stained a white color. This comes from the secretion of the Yama-mai which it emits after having finished spinning. The cocoons are then taken off the Kunogi, together with the leaves to which they are attached, and a small portion of the branches. They are then brought into the house, and placed upon shelves. About ten days subsequently the leaves are stripped off, and the cocoons, held by the lower and broader ends, are shaken. Those which do not rattle are considered to contain dead chrysalides, and after having been dried through the action of a charcoal brazier, are reeled. Those which rattle on being shaken are considered to be in good condition, and such of them as are to be reserved for seed are placed in trays, and the moths emerge in about twenty-five days from the time of spinning. The remainder are, of course, subjected to heat, in order to kill the chrysalides, and are reserved for reeling.

The moths emerge between 4 in the afternoon and night, and the great majority of the first moths are males. The proportion was stated to us to be 300 males to 10 females.* The males are then secured in the bell-shaped cages already mentioned, and as the females emerge, they are distributed among the males. It would be best, we heard, to place but one couple in a cage; in practice, however, several couples were put into the same, otherwise there would not be sufficient cages. One of the men said he had as as many as 500. The bottoms of the cages are then closed with paper. The coupling commences in the evening, and lasts ten or twelve hours,† after which the males are thrown away and die. It happens now and then that other males, coming from a distance, fly to the bars of the cages and couple with the females inside; these however are looked upon not as legitimate husbands, but as interlopers, and their presence or absence does not enter into the calculations of the rearers of this district. The females then lay their eggs, as already stated, on the bars of the cages. This operation lasts four or five days, the average number of eggs to each female being estimated at from 150 to 200. The females then die. The best eggs are those laid on the first two or three days, and it is considered preferable that the males which emerge on one evening should couple with the females which emerge on the following evening.

The same process which has already been described is then adopted with the new eggs.

The men to whom we spoke did not seem to trouble themselves much about the Uji. They all allowed that this parasite preys upon the chrysalis of the Yama-mai, and they considered that it was more prevalent after a rainy season. They even talked of *ten* Uji found in one chrysalis. To our questions as to how they knew whether it existed, and at what stage of the Yama-mai's life it was observable, we received the invariable answer, that they could only detect it after the worm had become a chrysalis, which did not rattle in the cocoon when the latter was shaken; that such chrysalides never turned into moths, and generally contained Uji.

With regard to other diseases, they stated that after the 4th rest dark spots sometimes come out upon the worms, which subsequently die before spinning: that they are also subject to attacks of diarrhœa, which prove fatal; that another disease shows itself by a watery fluid exuding from the pores, the worms turning a brown color and then dying. No particular names appeared to be given to these maladies. Our informants also said that if a considerable amount of rain falls whilst the egg-papers are attached to the Kunogi in the open air, the eggs are apt to be spoiled.

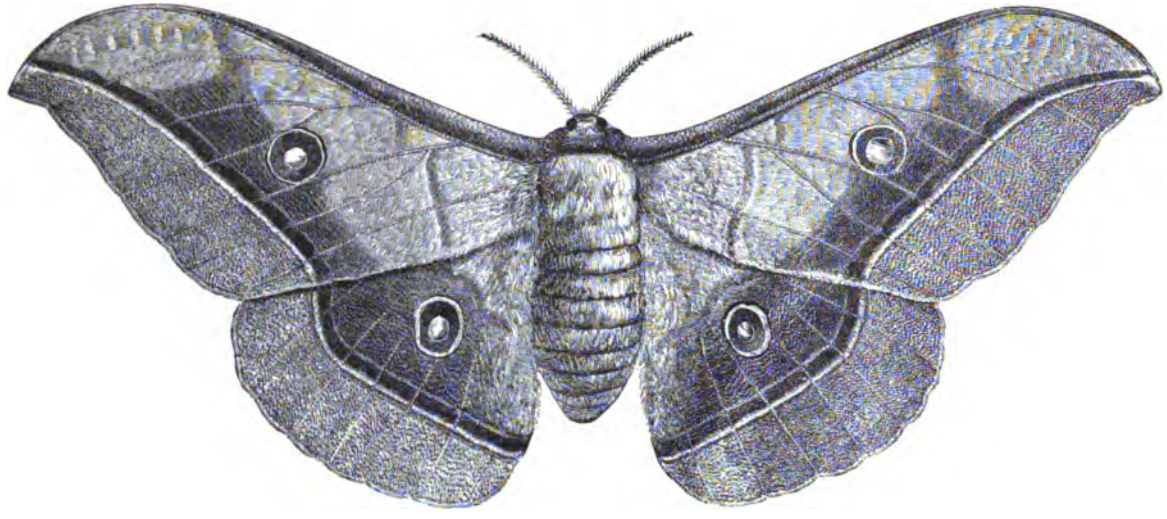
We were shown a species of creeping plant called *Tonzuru*, with leaves resembling those of the Convolvulus and a dark stem, which sometimes clings to the Kunogi. If the Yama-mai eats of these leaves, it is poisoned and dies at once.

---

*It is not clear what our author here means; but probably that in a given lot of cocoons 300 males will appear by the time 10 females have issued. If he means that the sexes are proportioned as 300 ♂ to 10 ♀, then the statement is erroneous, as in a given lot the females predominate at last, so as nearly to equal the males in number.

†This is also most probably an error; for there is abundant evidence to show that coitus lasts seldom as long as an hour.

[Fig. 60.]



PERNYI MOTH, FEMALE.

THE PERNYI SILKWORM—*Attacus* [*Antheræa*] *Pernyi*, Guér-Mén.

(Lepidoptera, Bombycidæ)

[Fig. 61.]

This is also an oak-feeding species which has been introduced from Northern China, and it so closely resembles *yama-mai* that a few remarks by way of comparison with the latter, will serve my purpose.

It was named after M. Perny, a missionary who, in 1850, sent it to France from Mandchouria, China. It has been cultivated in Europe with better success than has attended the culture of *yama-mai*, and in this country the success with it has also been greater. It develops more rapidly than the *yama-mai* and differs essentially from that species in being double-brooded, and in passing the winter in the chrysalis state, like *cynthia* and our native species. This trait gives it a great advantage over *yama-mai*, as not only can more silk be produced, but we can more easily obtain sound eggs. It is also less affected by confinement indoors. Its cocoon is not so valuable, though ranking third best of the eight species treated of.

The egg (Fig. 61, enlarged and natural size) is of about the same size, form and color. The worm in the first stage is of a chocolate-brown with the tubercles reddish and emitting reddish bristles. In the second stage it is yellowish-green; in the third and fourth it becomes greener, while silvery spots begin to show at the base of the anterior tubercles. In the last stage it is of a dark green with a faint reddish lateral line over the stigmata; the head and legs are light brown with black spots and the triangular anal mark is chocolate-brown. In form and general appearance it resembles *yama-mai*.

The cocoon (Fig. 61) is suspended by a cord which does not, however, materially effect its reeling properties, as it is attached only to the loose outer silk. The silk is yellowish-gray, stout, brilliant and valuable. It is almost twice as thick as that of *yama-mai* and stuffs made of it are said to have the appearance and nature of mixed silk, cotton and wool.

Some eggs which I received from Dr. Wallace, of England, in 1869, were so injured on the way hither that but few of them hatched, and none of the worms completed more than one moult. I have not, therefore, been able to present a figure of the worm, but through the courtesy of Dr. Wallace, who sent me specimens, I present good figures of the cocoon and moth. The moth (Fig. 60, female) bears a striking resemblance to *yama-mai*, and varies nearly as much in color. The tips of the front wings are generally a little more curved; there is less black about the eye-spots, the hind wings are less produced behind, so that their transverse band is more in a line with that of the front wings, and the ground color is usually darker and more uniform.

In China the species is reared in the open air in a wild state, and also in-doors on cut branches kept fresh by insertion in vessels containing water. In this country Mr. Andrews obtained cocoons from the first brood of worms by the 4th of July: the moths began to issue about three weeks later; copulation immediately ensued, and by the middle of August, or about ten days from the time of laying, the second brood of worms began to hatch. He also found that the worms would feed on Beech and Sweet gum.

The Tusseh Silkworm (*Attacus Mylitta=Antheræa Paphia*), an insect found in India, and which is quite common in the wild state, especially in Bahar, Assam and Bengal, feeding on the *Rhamnus jujuba*, is very closely allied to *Pernyi*, and should, perhaps, only be considered a geographical race. It bears the same relation to *Pernyi* as does the India castor-bean-feeding *ricini* to the Chinese ailanthus-feeding *cynthia;* and differs principally in the cocoon which is more solid, and hangs by a more solid, harder cord. It has never been introduced into America, though its silk is much used in its native country, and, if not put into hot-water, the goods made from it have a wonderful durability.

SUMMARY.

There can be no good reason given why silk-culture may not become one of the industries of this country, or of our State—especially if fostered at the start. I would, however, advise no one to enter into it on a large scale, as a business. The raising of silk is seldom lucrative, even in the most favorable countries; for in this as in most other industries, the principal profits accrue to the middle men, reelers and manufacturers; but on a small scale, and prosecuted in connection with other branches of Agriculture and Horticulture, it will give most desirable returns for the time employed. The erection of a few reeling establishments is absolutely necessary to establish this industry.

For in-door culture, no worm surpasses the Mulberry species (*mori*).

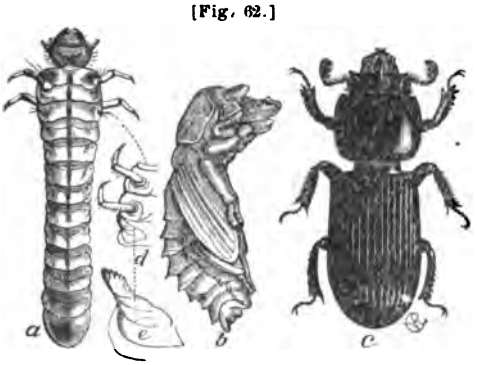
out-door culture none at present surpass the Ailanthus species (*cynthia*), though if *yama-mai* and *Pernyi* can once be acclimated, their cocoons are more valuable. Of the native worms *Polyphemus* is the most valuable and important, its silk being easily reeled and of excellent quality: *Cecropia* comes next in order, its silk being reeled with difficulty, while that of *Promethea* and *Luna* is of less value, has never yet been, and probably cannot be, reeled.

INNOXIOUS INSECTS.

THE HORNED PASSALUS—*Passalus cornutus*, Fabr.

(Coleoptera, Lucanidæ.)

[Fig. 62.]



Many an one will doubtless recognize in the insect illustrated at Figure 62, *c*, the "bug" with which he, or she, as a child, was wont to play at "oxen"—the curved horn on the head forming such an inviting projection on which to hitch, by means of a thread, small chips and other diminutive objects, to be dragged by the rather awkward beast of of burden. Every pioneer in this Western country, as he rolled over huge decayed logs, in the work of clearing his land to make it ready for the plow, must have become familiar with this highly polished coal-black beetle. Every woodsman who has split or grubbed an old stump, will be likely to recognize in this horned "bug" an old acquaintance. Every entomologist who has dug into or pulled to pieces old rotting stumps, in search for other treasures, must time and again have seen this lazy, clumsy *Passalus* tumbling down with the loose and crumbling dust and excreta of its own making, and expressing its disapproval of such summary disturbance in the plainest manner, by emitting a peculiar half-hissing, half-creaking noise. And though met with at almost every step in his forest rambles,

"Where wild birds sing beneath the leafy bowers,"

the inquisitive student has no doubt found himself repeatedly examining specimens, not only to admire the elegance and beauty of form, but to ascertain the means by which the peculiar noise is produced. A sufficiently careful examination will end in the knowledge that it is caused by the rubbing of the rather horny terminal joints of the abdomen, known as the *pygidium*, against the inside of the hard wing-covers.

This insect cannot be considered injurious in any sense of the word,

and might with propriety be introduced in the section of "Beneficial Insects." It is never found in sound or green wood, but invariably in that which is decaying; and it very materially assists and hastens the reduction of stumps which might otherwise remain treble the length of time to occupy valuable ground, and serve as an eye-sore to the careful farmer in wooded countries. Unseen and unheard it carries on incessantly the good work of converting useless timber into mould which enriches the soil; and this has been its office in all the past ages of its existence. A decaying, moist condition of the wood is necessary to its development, and it will be found most common on low moist ground, and in Oak, Hickory and Sweet gum logs or stumps.

Common as is this beetle, its larva and pupa are rarely seen, and seem to be unknown even to most entomologists, while no good figures of them have been published.

The larva (Fig. 62, *a*) is of a very exceptional character being the only one in this country which possesses but four well developed legs, for though many butterflies in the imago state have the front pair functionally impotent, no other insect than our *Passalus* exhibits a similar feature in the larva state. Indeed the only other larvæ in the whole Class of Insects which are similarly characterized, are those belonging to the same genus in other parts of the world. The third pair of legs really exists, however, in a rudimentary state, as shown at Figure 62, *d*. This larva is of a bluish-white color with the anterior joints broader and flatter than the rest. It transforms in the fall of the year, within the wood it inhabits, to a whitish pupa (Fig. 62, *b*) in which the front pair of legs is thrown forward under the head, and the horns of the future beetle show plainly on its top. The pupa lasts but about a fortnight, when, throwing off the pupal garb, it becomes a perfect beetle. At first the parts are all beautifully white and delicate; then the head, thorax and limbs gradually become amber-brown, and lastly the wing-covers assume this color. The whole body then deepens very gradually so that many days elapse before the coal-black color is acquired; and in the month of August the beetle is as often found brown as black. As larvæ only half grown are found in company with those that are full grown, they require at least two years to mature.

PASSALUS CORNUTUS Fabr.—*Larva*—Color bluish-white, with a dark medio-dorsal line; polished, with scarcely any hairs; 13 joints exclusive of head; slightly arched; the thoracic joints broader and flatter than the rest [though in alcoholic specimens they often appear the reverse]; joint 1 with a prominent neck-wrinkle underneath, and with a slight horny depression each side above, the prominences immediately outside of the depression being often marked with dark brown; abdominal joints, 4—11 inclusive, each with a broad, slightly elevated fold, occupying the hind ⅓ of the joint in the middle of the back, gradually increasing until at the sides it occupies the whole width of joint; 13th or anal joint, bulbous, as long or longer than any of the others; anus transverse, surrounded by triangular folds. *Head*, except the parts mentioned below as dark brown, light rust-brown; rather small; flattened above; smooth, with a few stiff lateral yellowish hairs springing from ocelli-like dots; antennæ 3-jointed, the basal joint broad, short; 2nd only half as wide and about the same length; 3rd brown, as long as 1 & 2 together and fusiform; epistoma large, transverse, divided in two by a brown transverse line; labrum smaller, transverse-oval, and sparsely furnished with stiff, yellow hairs; mandibles moderately large, with two sharp-pointed teeth at extremity and a larger single tooth inside; brown with the teeth black; maxillæ composed of a basal transverse piece, a stout cardinal piece; two inner lobes, well separated, pointed and curved inwardly in the same direction as the madibulary teeth and with their inner border fringed with stiff hairs; maxillary palpi 3-jointed, the

basal broadest, 2nd rather longest, 3rd brown, fusiform, constricted a little near the tip, and directed inwards; labium narrow, elongated, divided into 3 transverse pieces, the basal as long as the other two combined, the 3rd or palpigerous piece short and trapezoidal with a square, horny, brown plate extending between the palpi; labial palpi 2-jointed, joints of about equal length, the 2nd fusiform and directed inwards. *Legs*, well developed only on joints 1 and 2, being long, with a stout thigh, a slightly curved shank, and a fine-pointed horny claw; rudimentary on joint 3, consisting of a simple horny process, projecting obliquely outwards under the second pair of legs, and armed on the inside with 5 small blunt teeth (Fig. 62, *e*). *Stigmata* 9 in number, the first in a line with the others, on posterior portion of joint 1, the others on anterior portion of joints 4—11 inclusive. Average length 1.60 inches.

Described from one living, and two alcoholic specimens.

Madame Merian, in her work on the insects of Surinam, Pl. 50, has figured what purports to be the larva of *Passalus interruptus* with six legs, but as she has incorrectly figured, on the same plate, what is apparently a Lamellicorn larva for that of *Buprestis gigantea*, the probability is that her *Passalus* larva is equally spurious. Chapuis & Candéze (Catalogue des Larves des Coléopteres, 1853) describe and figure that of *P. distinctus* which, as in ours, has but 4 well developed legs. In their description they allow but 2 joints to the antennæ, and consider the joint which I have described as basal but a part of the head; in *cornutus* it is certainly well divided by sutures from the head. They likewise consider the anal joints 9 and 10 as but one, but, though bearing no stigmata, they are as thoroughly and distinctly segmented as are any other two joints of the body. I have not at hand the description of *cornutus* by Burmeister, to which they refer, but if he mentions more than nine pair of stigmata, as they indicate, he errs. Mr. Walsh (Proc. Ent. Soc. Phil., III, p. 559, note) speaks of the rudimentary legs being "decussated on the sternum." If the larva has the power of moving them, they may possibly be found in such a position but I have never seen them thus crossed.

Pupa—(Fig. 62, *b*) White, with all the parts of the beetle distinctly traceable, the head bent almost at right angles from the thorax, the jaws, enclosing the labrum, projecting prominently nearly in the same direction, and the front legs brought obliquely forward under them. The third pair of legs fully developed.

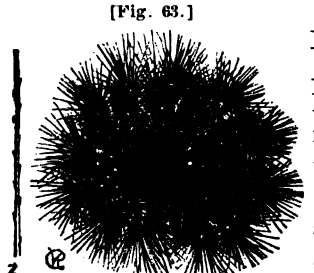
THE GREAT LEOPARD MOTH—*Ecpantheria scribonia*, Stoll.

(Lepidoptera, Arctiadæ.)

There is a large Family of moths, known as Arctians or Tiger-moths, which is rendered conspicuous by the beauty of design and boldness of contrast in color which its members generally present. There are two whose caterpillars are often seen, either rolled up cozily under some plant or crawling rapidly across a path, but which are not by any means generally known in their more beautiful and perfect states. They were both more than usually common the past year, and both have very similar habits. They neither of them can be considered injurious; but a brief account of their transformations, in this department of my Report, will doubtless please and gratify many an inquisitive reader, who has wondered what these "hedge-hog" caterpillars produce.

The species above-named is the largest, and perhaps the most beautiful of the Family in North America.

[Fig. 63.]



Its larva (Fig. 63) may be called the Large Black Bear, as the hairy worms of our different Arctians are popularly called bears, and the Family name was derived from the Greek word for "bear." It is often observed in the fall of the year, though few persons have ever seen the moth which it produces. This larva is black, and so thickly covered with jet black spines as almost to hide a series of roughened warts on each joint, from which the spines spring. When

disturbed, it curls itself up, and then the sutures of the joints are seen to be reddish brown, in strong contrast with the black of the rest of the body. If carefully observed, the spines will be seen to be barbed, as represented at *b*.

This worm feeds, mostly during the night, upon the wild Sun-flower (*Helianthus decapetalus*), the different species of Plantain (*Plantago*), and upon Willows. My friend J. A. Lintner, of Albany, N. Y., thinks it likewise feeds on Black Locust, as he has often found it beneath that tree and has fed it on the leaves. It comes to its growth in the fall, and curls up and passes the winter in any shelter that it can find, being especially fond of getting under the bark of old trees. In the spring, it feeds for a few days on almost any green thing that presents itself, and then forms a loose cocoon, casts its prickly skin, and becomes a chrysalis. The chrysalis is black, and covered with a beautiful pruinescence, which rubs off almost as readily as that covering a Duane's Early plum. It has a flattened blunt projection at the extremity, armed with a few barbs and bristles.

In a few exceptional instances I have known both this and the following species to go through all the transformations and produce the moth in the fall. The chrysalis state lasts but about a fortnight when the moth escapes.

[Fig. 64.]

The accompanying illustration (Fig. 64) represents the female moth at *a*, and the male at *b*. The upper portion of the abdomen is steel-blue, or blue-black, marked longitudinally along the middle and sides with yellow or orange. With this exception, the whole insect is white marked and patterned with dark brown, as in the figures. The male differs from the female principally in his smaller size and more acuminate wings, and by the narrower abdomen, which is also generally duller in color, with the pale markings less distinct. The markings on the wings, vary in a striking manner in different individuals, the oval or elliptical rings sometimes filling up, especially in the male, so as to look like black blots. This insect is considered rare in New England, but is much more common in the Mississippi Valley. It occurrs still more abundantly in the Southern swamps, where the larva is dubbed "Fever Worm" by the negroes, under the absurd impression that it is the cause of fever and ague.

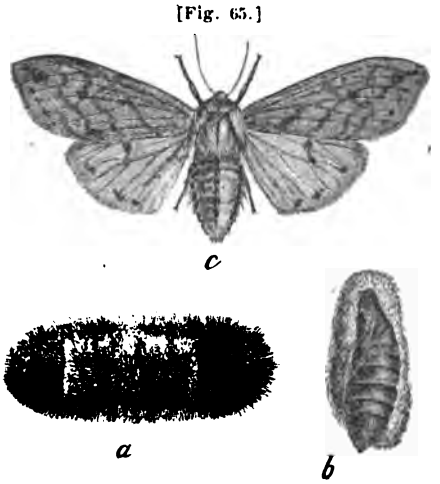
As an illustration of the wonderful power of resisting extreme cold, which this caterpillar possesses, I will quote the following experience communicated to me by Mr. Lintner. He says: "I had placed one for hybernation in a small keg among leaves, which I inserted in the ground. During my absence from home, either the thawing of the snow or the wind had overturned the keg, and driven away the leaves. On my return I found the larva remaining, but stiffly frozen, with its head encased in ice and fastened to the ground. As an experiment I detached a piece of the ground with the larva, and placed it in a warm room. On the thawing of the larva and the release of its head, it was restored to activity."

ECPANTHERIA SCRIBONIA, Stoll.—*Larva*—(I know of but one good description of this larva, and that by Mr. Wm. Saunders, in Proc. Ent. Soc., Phil., II, p. 29; but as that is not as full as it might be, I give the following): Average length 2¼ inches. Head black, polished, brownish at sides and below; epistoma, antennæ and palpi more or less distinctly glassy white, the joints of antennæ marked with light brown, cervical shield brown-black Body above black, inclining to brown laterally; bright reddish-brown at sutures, showing in strong contrast, especially between joints 3—10 when the larva is curled up, but scarcely visible when straightened and contracted. Verrucose warts arranged as follows: On joint 1, two each side of cervical shield; on jts. 2 and 3, a transverse row of 8; on jts. 4—11 inclusive 12, the 4 on dorsum trapezoidal, the two anterior ones approaching nearest; on jt. 12 a transverse row of 6. Venter dull purplish-brown, the legs of the same color, the legless joints with 4 small verruc se warts. Hairs barbed, stiff, spine-like and jet black.

THE ISABELLA TIGER MOTH—*Arctia Isabella*, Smith.

(Lepidoptera, Arctiadæ.)

[Fig. 65.]



The larva of this insect (Fig. 65, *a*) is very common with us and is familiarly known by the name of the Hedge-hog Caterpillar. It is thickly covered with stiff black hairs on each end and with reddish hairs on the middle of the body. These hairs are pretty evenly and closely shorn so as to give the animal a velvety look; and as they have a certain elasticity, and the caterpillar curls up at the slightest touch, it generally manages to slip away when taken into the hand. It feeds on Plantain, Clover, Dandelion, grasses, and a variety of other plants, and after passing the winter in some sheltered spot, rolled up like a hedge-hog, it comes out in the spring to feed upon the first herbaceous vegetation, and finally spins its cocoon (Fig. 65, *b* represents one cut open, giving a view of the chrysalis) and goes through its transformations. The cocoon is composed principally of the caterpillar's hairs (which are likewise barbed) interwoven with coarse silk. The chrysalis is brown with tufts of very short golden bristles, indicating the positions of the larval warts, and with a tuft

of barbs at the extremity. The moth is of a dull orange color, with the front wings variegated with dusky, and spotted with black, and the hind wings somewhat lighter and also with black spots.

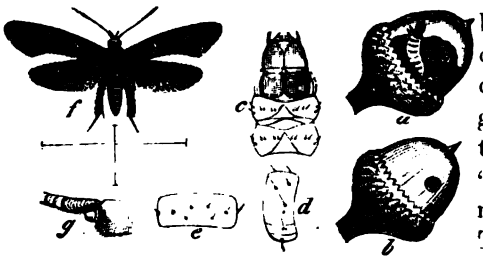
Mr. Huron Burt, of Williamsburg, informs me that this caterpillar is also called "Fever-worm" in his neighborhood. As the miasma of the Southern swamps induces ague, and as the large black species is found abundantly in such situations, the two circumstances have doubtless been associated through ignorance; and some Ethiopean, right from Dixie, has perhaps perpetuated the name in Missouri, by applying it to our more northern Hedge-hog Caterpillar.

Neither of these insects are, so far as known, attacked by any parasite. though a peculiar fungus-disease, probably identical with *Muscardine* in the Silkworm, (see p. 88) often causes the larvæ to die. Worms attacked with this disease fasten themselves firmly to some stem, and, stretched out naturally, death would scarcely be suspected were it not for a certain rigidity, and a mildew-like powder covering the skin.

THE ACORN MOTH—*Holcocera glandulella*, Riley.

(Lepidoptera, Tineidæ.)

[Fig. 66.]



The mast which is so valuable to the swine breeder in the oak-land sections of the State, is often very seriously affected and greatly diminished in quantity by the workings of the larva or "grub" of a species of long-snouted nut-weevil (*Balaninus rectus*, Say.) The female, with her long bill, pierces a hole in the young acorn, and deposits therein an egg which gives birth to a legless, arched grub with a brown head. This grub devours during the summer, the contents of the acorn, and in the autumn drops, with the rifled fruit, to the ground, where it soon gnaws its way out through a circular hole and buries itself for the winter. It becomes a pupa in the spring, and eventually issues as a beetle.

After the original depredator has vacated its tenement, a little guest-moth comes along and drops an egg into the already ruined acorn. The worm hatching from this egg grows fat upon the crumbs left by the former occupant, rioting amid the refuse (Fig. 66, *a*) and securing itself against intruders by closing with a strong covering of silk, the hole which its predecessor had made in egress (Fig. 66, *b*). In the winter time, or in spring, or early summer, the farmer who notices three-fourths of the acorns under his trees infested, as they have been for the past two years, by this worm; is very apt to consider it the true culprit, whereas it is rarely, if ever, found in acorns that have not first been ruined by the weevil above mentioned or injured by some other insect, or in some other way.

This after-comer is of a yellowish or grayish-white color, often with dark marks on the back, a light brown head, and a horny piece of the same color on the first and last joints, and small hair-emitting dusky points over the body (see Fig. 66, *c*, *d*, *e*). It is, withal, easily distinguished from the weevil larva by its full complement of six true and ten false legs. It changes to the chrysalis within its borrowed domicile, and the chrysalis gives forth the moth by first pushing partly through the silken door.

The moth (Fig. 66, *f*, ♀) is ash-gray in color, and characterized chiefly by two distinct spots near the middle of the front wings and a transverse pale stripe, well relieved behind, across their basal third. The male differs from the female by the basal joint of his attennæ being much flattened and articulating with the stalk by means of a nodule (Fig. 66, *g*). The moths issue all along from the end of April till September. They vary much in size and conspicuity of design. The following description of the species was first published in the *Canadian Entomologist* (Vol. IV, pp. 18—19).

HOLCOCERA GLANDULELLA, Riley, (Fig. 66, *f*, ♀)—*Imago*.—Alar expanse 0·50—0.80 inch. Front wings silvery-gray, more or less distinctly suffused and marked with fuscous: two distinct dark discal spots; a pale transverse stripe across the basal third of wing, slightly elbowed outwardly at its middle; this stripe is well relieved behind by a dark shade, and this shade generally extends from the elbow to the costa above discal spots, forming a more or less distinct triangular shade in the anterior middle portion of wing: three tolerably distinct dusky spots surround the discal dots on the outside; and a series of minute vein-specks mark the posterior margin; fringes concolorous. Hind wings of a more glossy, warmer, brownish-gray, the reflection inclining to golden in certain lights; fringes concolorous but not glossy. Under surface uniformly of same tint as hind wings. Head, thorax and legs concolorous with front wings; abdomen with hind wings, the joints often ringed with a paler shade; Apical joint tipped with yellowish or pale pulvous hairs, the ovipositor of ♀, which may be exserted one-half the length of abdomen, of same color. The basal antennal joint of ♀, the nodule on ♂ attennæ, base of palpi, and sometimes tarsi, also tinged with fulvous.

Described from 8 ♀s, 20 ♂s, all bred from acorns. The intensity of the dark shadings is quite variable, and in some specimens the basal space shows decidedly paler than the rest of wing.

Larva—Length 0.35—0.50 inch. Largest in middle of body. Translucent grayish-white, or yellowish, with blue-black vesicular dorsal marks. A conspicuous light brown head and cervical shield, and dusky anal plate. Head with the mouth parts darker, and the sutures and margins likewise darker and well defined. Piliferous spots small but quite noticeable from being brown, the hairs springing from them pale and soft. The dorsal ones on joints 2 and 3 are geminate and in a transverse row (*i. e.* there are 4 pair, Fig. 66, *c*), while at the sides of these joints there are three triangularly arranged, the front one sometimes double. Joints 4—12 with four, which are dorsal, nearly in a square, the hind pair farthest apart (Fig. 66, *e*), two which are lateral in a transverse line with stigmata (Fig. 66, *d*), the lower sometimes double, and one which is subventral in middle of joint. Stigmata small and bright rufous. Legs same color as body, the thoracic tipped with brown, the prolegs with a ring of minute brown hooks.

Described from numerous specimens.

Pupa—Light brown, smooth, with no characteristic marks.

ERRATA.

Page 112, in the heading, for "Hübn." read "Drury."
Several foreign words are not properly accented for lack of proper types

INDEX.

A

Acorn Moth 144
Actias Luna, ... 123
Acrobasis nebulo 38
" *nebulella* 42
" *juglandis* 42
" *consociella* 45
Ailanthus tree—A good word for 120
Ailanthus Silkworm 112
" " —Difference between Castor Bean and Ailanthus Worms. 112
" " —Retrospective History of 113
" " —When introduced into America 114
" " —Thoroughly acclimated in America 115
" " —Value of the Cocoon 115
" " —Its Natural History 117
" " —Larval Changes 117
" " —Best Method of raising 119
Amphicerus bicaudatus 51
Antheræa yama-mai 130
" *Pernyi* 137
" *Paphia* 138
Antidote for Paris Green 13
Apple-leaf Skeletonizer 44
" " Tyer 46
" " Folder—The Lesser 47
" " Bucculatrix 40
" " Twig Borer 51
" " Worm, again 22
Arctia Isabella 143
Arma spinosa 19
Arsenious acid for Potato bugs 14
Ashes and Air-slacked Lime for Potato bugs 14
Asilus Missouriensis 21
Attacus Cecropia 103, 138
" *cynthia* 112, 138
" *Luna* 123, 138
" *Polyphemus* 121, 138
" *Promothea* 121, 138
" *Selene* 125
" *yama-mai* 130, 138
" *Pernyi* 137, 138
" *Mylitta* 138

B

Banchus fugitivus 41
Beneficial Insects 72

Best Bandage for Apple-worm 23
Birchromate of Potash for Potato bugs 14
Boissière's Silk Establishment 82
Bombyx mori 75, 128
Bostrichus bicaudatus 51
Botrytis Bassiana 86
Brachinus Kansanus 21
Brochimena annulata 20
Bucculatrix pomifoliella 49
" *thuiella* 51
Buprestis gigantea 141

C

Cabbage as Food for Colorado Potato Beetle 10
" bug—The Harlequin 35
Castor Bean Silkworm 112
California—Silk-growing in 79
Callidium amœnum 54
Callosamia Promethea 121
" *angulifera* 122
Carbolate of Lime for Potato bugs 14
Cecropia Silkworm 103
" " —Larval Changes 106
" " —Parasites of 107
" Cryptus 110
" Tachina-fly 108
Chalcis mariæ 109, 110
Chauliognathus Pennsylvanicus 28
Chrysopa 45
Citheronia regalis 129
Classification of N. A. Grape-vines 60
Cliviocampa sylvatica 41
Codling Moth, again 21
" " —Time of Year that the first Moths appear 21
" " —Best kind of Bandage for 23
" " —New Methods of trapping 23
" " —Wier's Trap 23
" " —It attacks Peaches 21
" " —Jarring 25
" " —Fires, Lights, Bottles of Liquid as Remedies 27
" " —Natural Enemies 26
Colaspis flavida 34
Colorado Potato Beetle 5
" " " —Its Injuries in 1871 5
" " " —Amount of Damage caused by it in Missouri 7
" " " —New Territory invaded 8
Colorado Potato Beetle—It spreads, but does not travel in the Sense of leaving one District for Another 9
" " " —New Food: Cabbage 10
" " " —Its Hibernation 11
" " " —More about Paris Green 11
" " " —Antidote for Paris Green 13
" " " —Other Applications for 13
" " " —Mechanical Means of destroying 13
" " " —Arsenious acid 14
" " " —Sulphate of Copper 14
" " " —Bichromate of Potash 14
" " " —Powdered Hellibore 14
" " " --Carbolate of Lime 14
" " " --Mandrake or May-apple 15
" " " --Dog-fennel 15
" " " --Natural Enemies increasing 16
Cryptus extrematis 110
" *nuncius* 110
" *samiæ* 110
" *Smithii* 111

Cynthia cardui 129

D

Danais archippus 129
Datana ministra 129
Diseases of Mulberry Silkworm 87
Dotted-legged Plant-bug 19
Dryocampa senatoria 41
" *stigma* 41

E

Ecpantheria scribonia 141, 142
Elaphidion parallelum 54
Empusa muscæ 88
Eriosoma lanigera 69
Euchætes egle 41
Euschistus punctipes 19, 20
Exorista phycitæ 40
" *leucaniæ* 108
" *var. cecropiæ* 108
" *militaris* 109

F

Fifteen-spotted Ladybird 17
Fires for Codling Moth 27

G

Gærius olens 21
Grand-daddy-long-legs 17
Grape-vine Colapsis 34
" —Insects injurious to 53
Grape-vine—Red-shouldered Sinoxylon 53
" Disease 55
" leaf Gall-louse 55
" " " —Further Proof of the Identity of the American and European Insects 57
" " " —Gall-louse and Root-louse identical 57
" " " —Habits of Root-inhabiting Type 58
" " " —Susceptibility of different Vines to its Attacks 60
" " " —Means of Contagion from one Vine to Another 64
" " " —Probable Reason why its Injuries are greater in Europe than with us 66
" " " —Practical Suggestions 67
" " " —Remedies against 68
" " " —Resume of its History 69
" " " —Conclusion 70
Grape-vines—Classification of N. A 70
Great Leopard moth 141
Green Apple-leaf Tyer 46

H

Hammond's Knot-horn 45
Harlequin Cabbage-bug 35
Heliothis armigera 129
Hellebore for Potato bugs 14
Hialophora Cecropia 103
Hippodamia glacialis 18
Holcocera glandulella 144, 145
Horned Passalus 139

I

Icy Ladybird 18
Improved Patent Insect Destroyer 15
Insects injurious to Grape-vine 53
Isabella Tiger Moth 145

J

Jarring for Apple-worm 25

K

Kansas Bombardier-beetle 21

L

Larval Changes of Cecropia worm 106
" " " Cynthia " 117
" " " Luna " 124
" " " Polyphemus " 126
" " " Promothea " 121
" " " Yama-mai " 132
" " " Pernyi " 137
Lesser Apple Leaf-folder 47
Limneria fugitiva 41
Lobophora 129
Long-tailed Ophion 107, 129
Lyctus opaculus 54
Luna Silkworm 123
" " —Larval Changes 124

M

Mandrake for Potato bugs 15
Mary Chalcis-fly 109, 129
Mascicera 129
May Apple for Potato bugs 15
Microgaster 45
Missouri Bee-killer 21
" —Silk-growing in 83
Mulberry Silkworm 75
" " —Its past History 75
" " —Its History in America 77
" " —Silk-growing in California 79
" " — " " " Kansas 82
" " — " " " Missouri 83
" " —Natural History of 84
" " —Enemies and Diseases 87
" " —Best Varieties or Races 91
" " —How best to rear 92
" " —Cocoonery 93
" " —Choking the Chrysalis 96
" " —Egg-laying 97
" " —Reeling 98
" " —Best Food for 100
" " —Osage orange for 100
Murgantia histrionica 35
" *munda* 35
Muscardine 92
Myelois indiginella 57
Mysia 15-punctata 18

N

natural History of the Mulberry Silkworm 84

Nazara 20
Nebraska Bee-killer 21
New Methods of trapping Apple-worm 23
Notes of the Year 5
Noxious Insects 72

O

Ophion macrurum 107
Osage orange for Mulberry Silkworm 100

P

Pachymerus vulnerator 28
Paris Green for Potato bugs 11
" " Duster 12
" " —Antidote for 13
Parasites of Cecropia Worm 107
Parus atricapillus 107
Passalus cornutus 139
" *distinctus* 141
" *interruptus* 141
Peaches—Codling Moth attacks 22
Pebrine 89
Pempelia Hammondi 44
Pentatoma rufipes 20
Pennsylvania Soldier-beetle 28
Peritymbia vitisana 55
Perilitus indagator 43
Perillus circumcinctus 19
Periodical Cicada 30
Pernyi Silkworm 137
Phalangium dorsatum 17
Philonthus apicalis 21
Phygadeuon brevis 28
Phycita nebulo 38
Phylloxera vitifoliæ 55
" *vastatrix* 55
" *Rileyi* 66
Pimpla conquisitor 43
" *indagatrix* 43
" *annulipes* 43
Platysamia Cecropia 103
Prodenia autumnalis 129
Promachus Bastardii 21
Promothea Silkworm 121
" " —Its natural Enemies 123
" " —Larval Changes 121
Polyphemus Silkworm 125
" " —Larval Changes 126
" " —Natural Enemies 126

Q

Quedius molochinus 21

R

Rascal Leaf-crumpler 38
Red-shouldered Sinoxylon 58
Raphigaster 20
Ring-banded Soldier-bug 18

S

Samia Columbia 107, 111

Samia cynthia 112
" *Guerinii* 112
" *ricini* 112
" *Cecropia* 103
Saturnia maia 41
Sericaria mori 75
Silk-growing in California 79
" " Kansas 82
" " Missouri 85
Silkworms 72
" —Summary 158
Silkworm—The Mulberry 75
" —The Cecropia 103
" —The Ailanthus 112
" —The Polyphemus 125
" —The Luna 123
" —The Promothea 121
" —The Yami-mai 130
" —The Pernyi 137
Sinoxylon basillare 53
Spined Soldier-bug 19
Sphinx Carolina 129
Strachia histrionica 35
" *ornata* 36
Stiretrus fimbriatus 20
Sweetened-water for Codling Moth 27

T

Tachina phycitæ 40
" *anonyma* 129
Telephorus bilineatus 29, 30
Telea Polyphemus 125
Tortrix Cinderella 47
" *malivorana* 47
Two-lined Soldier Beetle 29

V

Vinegar for Codling Moth 27

W

Walnut Case-bearer 42
Wier's Apple-worm Trap .....

Y

Yama-mai Silkworm 130
" " —Larval Changes 132

ELEVENTH ANNUAL REPORT

OF THE

ST. LOUIS

AGRICULTURAL AND MECHANICAL

ASSOCIATION.

OFFICERS OF THE ASSOCIATION.

1872.

ARTHUR B. BARRET, *President.*

E. A. MANNY,	*First*	*Vice-Presidents.*
E. C. LACKLAND,	*Second*	
CHARLES SPECK,	*Third*	
G. O. KALB,		*Secretary.*
B. M. CHAMBERS,		*Treasurer.*
WM. M. LINDSAY,		*Sup't Fair Grounds.*

DIRECTORS.

ARTHUR B. BARRET,	E. C. LACKLAND,
D. K. FERGUSON,	CHARLES SPECK,
B. W. LEWIS, Jr.,	CHARLES P. CHOUTEAU,
E. A. MANNY,	A. PHILLIPS,
C. O. DUTCHER,	JAMES S. FARRAR,
JOSEPH SHEETS,	DAVID CLARKSON,

B. M. CHAMBERS.

PREFATORY NOTE.

In justice to all parties, it should be stated that the person appointed to prepare the Annual Report of the St. Louis Fair for the press is allowed considerable discretion, and is permitted to act as an independent writer, making suggestions or criticisms, and commending or fault-finding, as he sees fit. Beyond a faithful record of awards in the different departments, the Directory express their confidence in the person designated to prepare the Report, by allowing him to exercise his judgment as to the matter that should be included in the work. If there is anything wrong in the present volume, as relates to matters of fact or taste, the responsibility should fall upon the writer of this, and not upon the Directory.

If there are misspelled names (which is certain to be the case), the author would like to share the responsibility with the printer, and with the persons themselves, some of whom write their names to be read by no eyes except their own.

It is proper to add in this connection, that the Directory have ordered that the Fair of 1872 shall be continued nine days, from the 3d to the 12th of October, inclusive, and, from present indications, the next annual exposition will be greatly in advance of its predecessors in live stock, agriculture and the arts.

TABLE OF CONTENTS.

PAGE.

List of Officers 3
Preface 4
Secretary's Report 5
Introduction 9
Report of Different Classes—
Class A, Agricultural Department 27
Class B, Machinery Department 41
Class C, Mechanical Department 48
Class D, Products of Farm and Garden 62
Class E, Fruits and Flowers 69
Class F, Fine Arts Department 74
Class G, Textile Fabrics and Materials 82
Class H, Geological, Mineral and Chemical 88
Class I, Poultry, Sheep and Swine 95
Cotton Department 107
Exhibition in Amphitheatre ..... 113—160

SECRETARY'S REPORT.

Receipts and Expenditures of the ST. LOUIS AGRICULTURAL AND MECHNICAL ASSOCIATION *from January 1st to December 1st, 1871.*

Dr.		Cr.	
To Improvement acct.....	$16,427 86	By Cash, Jan. 1st, 1871.....	$521 54
" Furniture acct.....	261 55	" Gate fees acct.....	$70,974 25
" Bills payable acct.....	21,390 37	" Booth acct.....	22,027 50
" Expense acct.....	17,068 76	" Subscription acct.....	10,690 00
" Labor acct.....	6,296 39	" Cash.....	3,148 82
" Premium acct.....	33,393 55		
" Printing acct.....	4,220 65		
" Interest acct.....	7,774 23		
" Insurance acct.....	528 75		
	$107,862 11		$107,862 11

BALANCE SHEET,

To Improvement acct.....	$126,227 20	By Stock acct.....	$82,050 00
" Real estate acct.....	135,880 16	" Bills payable.....	75,068 46
" Horse acct.....	540 00	" Profit and loss.....	103,657 98
" Furniture acct.....	1,277 90	" Cash acct discount.....	3,148 82
	$263,925 26		$263,925 26

DECEMBER 1st, 1871.

G. O. KALB, *Secretary.*

The undersigned, Committee on Ways and Means, have examined the Books of the Secretary, and compared carefully the vouchers with amounts paid out, and find the report of that officer correct in every particular.

Signed,

G. B. ALLEN,
E. A. MANNY,
CHARLES SPECK,
} *Ways and Means Com.*

INTRODUCTION.

ORIGIN AND PROGRESS OF THE ST. LOUIS FAIR.

It would be both curious and interesting, if we could trace the history of great deeds, or enterprises of pith and moment, from their beneficent or baneful, but world-wide influence, all the way back through alternations of trial and triumph, to the idle dream of the reverizing brain that gave them birth. To see how this vagary of the mind became an imperfect image—an idea; how this idea pleased the spirit of the dreamer, and was nursed into thought; how this thought, fully developed, took the shape of purpose; how this purpose at last discovered a plan, and how this plan finally crystalized into facts, and became a power in the world, for good or evil. What a vague dream was that first thought of Columbus, which has ripened into a vast continent with many millions of people; the home of modern civilization and the strong bulwark of human liberty. The doctrine of specific gravity was discovered amidst the pleasant divertisement of an ancient bath; celestial angles were first used by a shepherd boy lying upon his back and gazing upward on the starlit sky; the great doctrine of universal gravitation was revealed by the fall of an apple, and the steam engine, that has revolutionized the arts, and pushed forward the world a whole century at a stride, was discovered in the sputtering vapor of a boiling tea-kettle. The St. Louis Fair, which has become an agency for the accomplishment of incalculable good, may have had its origin in the post-prandial dream of some large hearted man, who saw its dim outlines in the graceful clouds that went up from a fragrant Habana. But great discoverers and inventors, whose thoughts bless the whole world of mankind, never see the end from the beginning; but other men, and succeeding generations push forward to comparative perfection the work that genius has already devised.

The St. Louis Fair is no exception to this general rule. It is true that the originators of this enterprise went into it with an honest, unselfish puspose, and an earnest zeal that would assure success in any good cause. There was no money making "ring" by which a few could be enriched at the expense of the many. On the contrary, the stockholders paid for their shares without expecting to ever receive dividends, and their expectations have been fully realized. All the stock paid in, and all the revenues derived from the Fairs, have

been devoted to enlarging the grounds, adding new and more spacious buildings, and in every way increasing the accommodations for both exhibitors and visitors. This principle alone, has done much to increase public confidence and assure permanent success to our annual exhibition.

The plan and purpose of the St. Louis Fair originated with Hon. J. R. Barret, who soon became associated with a few kindred spirits in the organization legally known as the "St. Louis Agricultural and Mechanical Association;" but which is popularly, and very properly, called the St. Louis Fair Association. The Association thus formed, was incorporated by an act of the State Legislature, and in the Fall of 1856, arrangements were made for holding the first Annual Fair. Fifty acres of land were purchased on the west side of Grand Avenue, at that time quite beyond the city limits, and almost beyond suburban improvements. Four miles northwest of the court house was then quite out in the rural districts. This land was enclosed, and near the centre, a handsome amphitheatre, (then considered quite monstrous in size) was erected. In addition to this really creditable structure, were two wooden buildings, more properly called sheds, for the use of the machinery and the mechanical departments. Then there was a large circular tent for the display of fruits and flowers in the centre, while the outside border contained numerous specimens of beautiful needle work; silk quilts, patch-work quilts, babies' dresses, worsted work, silk work and a hundred other kinds of female handiwork. These with a few improvised stalls and pig pens, furnished the accommodations for the first St. Louis Fair.

The attendance and the animals and articles on exhibition, corresponded well with the accommodations provided for them. When the Fair came it was considered a grand success; now it would be called a lamentable failure. A premium list of $10,000 was something unheard of, and notwithstanding the entry fees were paid by all exhibitors, they came in very respectable numbers, and the general result was much gratification to the originators of the enterprise, and much pleasure to those who carried off the golden prizes.

As this was before the advent of street railroads, the facilities for transit between the city and the Fair Grounds, were poor indeed; confined to omnibuses, carriages, furniture cars, baggage wagons, &c. When the roads were muddy it was something of an exploit for a lady to make the trip to the Fair.

OFFICERS OF THE ASSOCIATION.

As those gentlemen who accepted places in the directory of the Fair Association had plenty of hard work, instead of "hard cash" for their compensation, offices were not sought by mere speculators, money makers or glory seekers, and naturally fell into the hands of a few honest and earnest men, who were willing to do some work

for the public good. For the same good reason there have been comparatively few changes in the management of the Association during the sixteen years of its existence. From 1856 to 1860, Hon. J. R. Barret, the originator of the enterprise, was President of the Association, and devoted himself to its interests with an energy and singleness of purpose that challenged the admiration of all. The pressure of other duties compelled him to resign his position in 1860, and the presidency was held during that year by Andrew Harper, Esq., of St. Louis County. The resignation of Captain Andrew Harper led to the election of Charles Todd, Esq., of St. Louis, as his successor. Mr. Todd held the office during the war, and when the Association resumed active operations again in 1866, he resigned, and his place was filled by the election of the present incumbent, A. B. Barret, Esq., a relative of the original projector of the enterprise. He has filled the position of President for six years and by his energy and good judgment, has contributed largely to the continued growth and success of the Fair. The office of Secretary has been filled for sixteen years by G. O. Kalb, Esq., who has given his best services to the Association through all its periods of darkness and discouragement, as well as of hope and triumph.

During the period of the civil war, the Fair was suspended, and the Fair Grounds and buildings were appropriated for camp and barracks. In 1866, when the Association determined to resume its exhibitions under President Barret, almost every thing about the Grounds was in a state of dilapidation or decay, and the prospect was altogether disheartening. But energy and determination on the part of the executive officers, soon brought order out of confusion, and added new beauties and attractions to the scene of the former exhibitions. From that period on to the present, the progress of the great Fair has been rapidly and constantly onward and upward, until it has assumed colossal proportions, fairly entitling it to the character of a national exposition of agriculture and the arts.

THEN AND NOW.

A single glance at the Fair of 1856 and of 1871, will show by contrast what has been accomplished. At that time a few choice animals, but very few thorough breds, were gathered in from a small district of country. Some fine horses, a few fine cattle, a few Berkshire and Irish grazier hogs, a few merino and other sheep and some coops of geese, ducks, chickens and turkeys made up the animal show, while the display in the machinery and mechanical departments, of agricultural implements, the productions of farm, field and garden as well as of the loom and the needle, were barely creditable either in number or quality. Five thousand visitors on a single day was something to boast of, and $20,000 income for a single Fair, was a grand triumph, worthy of record in all the papers of the country.

Now the Fair Grounds contain eighty-five acres, beautifully situated and handsomely improved with walks, drives, shrubbery, trees, greensward, statues, fountains, millions of flowers in their season, a charming little lake, grotto, cascade, rustic bowers, and many other things to charm the fancy of any person who has a love for the beautiful. Nearly a quarter of a million of dollars has been expended in ornamenting the Grounds, and erecting suitable buildings. The latter enclose with their walls, and shelter with their roofs, about twelve acres out of the eighty-five, and furnish greater facilities for the exhibition of animals, agricultural productions, machinery and various works of art, than any other Fair Grounds in America, or perhaps in the world.

BUILDINGS AT THE FAIR GROUNDS.

The old amphitheater, which was the pride and boast of the Fair in its earlier days, has been converted into a grand exhibition hall for the display of the Fine Arts, Textile Fabrics, Wine, Fruits and Flowers; Food or material for food, embracing a thousand rare and beautiful things, preserves, cakes, jellies, jams, &c., produced by the genius and skill of a good housewife; Farm and Garden Products, Missouri Manufactures, &c. The inner circle of this amphitheater, where the blooded stock used to show their fine points and paces, now sparkles with fountains and is gay with myriads of bright flowers.

The new amphitheater, erected in the Summer of 1870, is the largest and finest structure of the kind in America, if not in the world. Its roof will shelter sixty thousand people, and the enclosed arena is 1320 feet, or one-fourth of a mile in circuit. The flag staff that rises in the center, from the summit of the lofty pagoda, is 196 feet high, and the stars and stripes that wave from it, may be seen from miles away.

The Machinery, and the Mechanical Halls, are both spacious, and well constructed brick edifices, the latter in the form of a Greek cross; but they are by no means adequate to the demand for exhibition room in these two important departments. The Cotton Department was supplied with a large wooden edifice during the last summer; and near it, an open but spacious and convenient edifice was erected for the display of farm implements and machinery. Several dealers in agricultural implements erected, in the same vicinity, suitable structures for the display of their wares, and with the machines and mechanical contrivances which were placed out doors, because they needed no shelter, nearly fifteen acres were given up to this very important department.

In addition to these buildings are the smaller edifices for the Mineral and Geological Department, the Gallinarium with its 210 compartments for the accommodation of poultry—600 stalls and stables for

horses and cattle, 250 covered pens for hogs and sheep. Most of these were taxed to their utmost capacity during the last annual Fair.

Then there are the Superintendent's Cottage, the office of the President and of the Secretary, three newspaper offices and some other structures. But all these form but the skeleton of the Fair; to give them both beauty and vitality, they must be filled with proper objects for exhibition, and crowds of visitors and sight-seers. This is easily done; for when the calendar marks the first Monday in October of each year, a scene of quiet beauty becomes animated by the presence of many thousands of happy people, with their happier children, and the different departments swarm with new and wonderful attractions.

ENTRIES FOR 1871.

The entries for 1871, are the best standard by which to judge of the past growth, and the present magnitude of the St. Louis Fair. The following exhibits the number of entries for 1871, and the aggregate is nearly two thousand in advance of the previous year, and from two to five thousand in excess of any other year in the history of the Fair. By observing the fact that, in many of these cases, a single entry embraces twenty, fifty, a hundred, or even five hundred individual articles, one gets a better idea of the vast extent and variety of the exhibition. As an example, the display of manufactured articles by the Pratt & Fox Malleable Iron Manufacturing Company, was a single entry, but embraced several hundred different articles embraced in this most creditable collection.

TABLE OF ENTRIES FOR 1871.

Agricultural Department,	754	Entries.
Machinery Department,	236	"
Mechanical Department,	792	"
Products of Field, Garden, &c.,	731	"
Cotton raised in Missouri,	71	"
Cotton raised in the Southern States,	445	"
Fruits and Flowers,	484	"
Fine Art Department,	525	"
Textile Fabrics and materials,	1051	"
Geological, Chemical and Mineral Department,	331	"
Poultry,	384	"
Sheep,	273	"
Swine,	462	"
Cattle,	383	"
Mules, Jacks and Jennets,	173	"
Horses,	976	"
Total,	8071	"

EXTENT OF COUNTRY CONTRIBUTING.

In the earliest years of the St. Louis Fair, it was purely a local institution, bringing within its immediate influence the city and county of St. Louis, and a few adjacent counties in Illinois and Missouri. At the end of two years the association took a bold step in advance, by abolishing all entry fees, and inviting the world to a fair and free competition at its annual exhibitions. The result was as surprising as it was gratifying to all parties. The field of influence began rapidly and steadily to widen, and the St. Louis Fair soon gained a national celebrity. The most noted stables in America began to send fine blooded horses, fine racers, trotters, roadsters, draft horses, &c. Importers and breeders of the best varieties of cattle, sheep and swine began to compete with each other for the princely premiums offered by the St. Louis Fair Association. Soon our neighbors in Canada began to send samples from their fine flocks and herds, and, within four years from its inauguration, the St. Louis Fair became familiar as a household word in most parts of the United States. Then came five years of suspension and gloom during the war, and then a re-inauguration in 1866, since which time the sphere of its influence has been rapidly and constantly extending in every direction.

The last Fair had on exhibition, animals, products, or manufactured articles from every quarter of the globe, and the institution is beginning to assume a true cosmopolitan character. Fruits and wine, as well as gold and silver bricks and nuggets, came from California, Nevada and Colorado; fine specimens of grass and grain, and thrifty young trees from the so called "American Desert;" hundreds of bales of cotton from the snow white fields of ten Southern States; horses, cattle, sheep and hogs, from the Western, Middle and Eastern States; products from the mills and factories, the looms, lathes and workshops of New England; rare and beautiful fabrics, or other works of art from England, Ireland, Scotland, France Switzerland, Germany, Holland and other European countries, and from the far off Orient and the islands of the sea. There was not a civilized or half civilized country on the globe, that did not have some product of art or nature to represent it at our annual Fair of last October.

VISITORS AND REVENUE.

The contrast between the Fairs of '56 and '71, is just as marked in the matter of attendance and amount of income as in any other feature. It is estimated from good data, that not less than a quarter of a million of people visited the St. Louis Fair, during the first week of October. Of this vast multitude, nearly, if not quite, one hundred thousand were present on Thursday, the grand climax of the week's

exhibition. This mighty throng of people represented every quarter, and almost every country of the habitable earth.

The gate fees and other sources of revenue during Fair week, amounted to upwards of ninety thousand dollars, a large excess over the income of any previous year. It is proper to remark in this connection, that the money income of the Fair, like every other feature, has been constantly on the increase, during all the years that the Fair has been held; and it may be added too, that the whole income, after deducting necessary expenses, goes directly into premiums and Fair ground improvements.

THE FAIR AS AN EXCHANGE.

The character of agricultural and mechanical Fairs in this country, is gradually undergoing a change for the better. Formerly, the grand object seemed to be reached when a red or blue ribbon was tied to a fat pig, a fine calf, a big cabbage head, or a showy bed quilt. This was well enough, as far as it went, but it halted at the very commencement of the great purpose for which Fairs should be established. A Fair should be, not only a great school of agriculture and the arts, teaching by example, and through the spirit of a healthful emulation; but a place for the buying and selling of animals, and all articles and commodities placed upon exhibition. This feature alone, will give permanent and pre-eminent success to an institution like the St. Louis Fair, and it should be encouraged and developed into full and healthy action. To do this efficiently, a suitable building at the Fair Grounds, should be given up to the business of an Exchange. With certain hours designated for the meeting of buyers and sellers, such a building would be thronged at the times designated, and the owners of fine stock, or of agricultural or mechanical products, would be brought into contact with those who might wish to purchase. A large bulletin board, to contain the briefly expressed wishes of buyers and sellers, would also aid in bringing the two classes together, and thus effect many sales. Nine-tenths of the exhibitors do not come to the Fair merely to contend for a blue ribbon and a diploma, medal or money. They compete for the premiums, because these marks of honor and distinction, when obtained, are the best possible advertisement of their choice possessions. Most exhibitors however, have fine stock, or other commodities which they wish to sell, and a great Fair, where multitudes are congregated, is the best of all places to find purchasers.

Does any one suppose that the owners of the best agricultural machines, such as reapers, mowers, threshers, &c., would put themselves to no inconsiderable expense to bring their wares to the Fair merely for grandeur? Far from it. They come to sell, and the farmer comes to buy, and fortunately he can purchase here under the most

favorable circumstances. He has plenty of time to examine the different machines, compare their qualities and prices, and then saves an agent's commission by purchasing directly from the manufacturer. Many a man has made more than his traveling expenses, in coming two or three hundred miles to the Fair, simply by the opportunity he enjoyed, of making good purchases at reasonable rates. As this fact becomes more widely known, a still greater multitude of farmers, merchants and mechanics will be drawn together upon the occasion of our great annual exhibition.

THE FAIR AS AN EDUCATOR.

Teaching by example is the best method of instruction known to the world. Nearly every thing we know in the arts and in practical science, comes through this channel. The lessons that we receive from teachers or professors in theology, metaphysics, philology, &c., are very good of their kind, but we are very apt to forget them. The farmer discovers the best kind of plows by seeing competition between different implements of this kind; the artisan or mechanic learns the superiority of a certain machine, or mechanical contrivance, by seeing it operate, and nearly all the best lessons of life are learned in the same simple manner.

There are thousands of men who are teachers without knowing it. The rich man erects an elegant mansion either in city or country, beautiful in design, tasteful in architecture, and with all proper surroundings and attractions. How many thousand people first and last, will take lessons from the architectural beauty or artistic accompaniments of this same mansion? The St. Louis Fair draws together every year thousands of people who come here as teachers, and hundreds of thousands who come as students. Neither party thinks of the role it fills, nor considers itself in the character of teacher or learner. The former teach altogether by object lessons. They bring together a great number of fine animals, and a still greater number of useful machines and mechanical contrivances; they also bring together many rich and rare products of the earth and of mechanical skill, and still rarer emanations of genius in the shape of painting, statuary, &c. The thousand teachers arrange and display their possessions to the best advantage and the hundred thousand pupils look on and learn.

Mr. Jones, who lives down on the frontiers of Arkansas, a little beyond the influence of railroads, comes to St. Louis in Fair time, to lay in his little stock of goods for a country store. He notices amongst the swine on exhibition some Berkshires, Chester Whites and Poland Chinas, either of which he thinks superior to the kind raised in his neighborhood—a kind by the way that is only a few removes from the wild boar—a sort of cross between an alligator and a crooked fence rail. Mr. Jones buys a pair of beautiful pigs and in a few years his neighborhood is stocked with the finest hogs in the whole country.

Mrs. Jones has come on the grand excursion with her good man, and she is fairly bewildered with the wonders at the Fair. She witnesses with uncommon delight the contest for superiority between five or six cooking stoves, that turn out fabulous quantities of the most excellent bread and biscuit in little more than no time. The teacher of the mysteries of baking gives her a short lesson, and a fine cooking stove goes down on the waters of Current river, and a few months later is followed by a dozen of these most useful and economical contrivances.

Master Charley Jones, the really hopeful son of his father, a bright youth of seventeen summers, has come with his parents to see the sights. With open eyes and an active brain, he spends two or three days in the different departments of the Fair, and goes home with knowledge that will benefit him all through life. Their neighbor, Mr. Robinson, has also come to spend a few days at this great festival of Ceres. He raises beef cattle, and here he can study bucolics to the best possible advantage. He has heard so much of the good fattening qualities of the short horn Durhams, that he makes a purchase, and in a few years there is a rich strain of Durham blood in all the cattle of that nieghborhood.

This teaching by objects, or example, is the grandest mission of an agricultural Fair. St. Louis never put into operation an agency so wide spread in its influence, and so thoroughly beneficent in its effects as our annual Fair. Every citizen in this whole community, whether in city or country, is directly and largely interested in its continued growth and prosperity; and it is pleasant to know that this is the general sentiment of the people.

THE FAIR AS A CREATOR OF WEALTH.

In the use of the above phrase we have no reference to the millions of money, more or less, which the Fair every year collects and distributes at St. Louis. We have no reference to the large amounts paid for gate fees, hotel bills, store bills, &c. This is nothing but a simple exchange and adds not a cent to the actual wealth of the world. But, as we have already hinted, the influence of the Fair in the introduction of better stock, in bringing to the knowledge of the public better farm implements, better seeds, and better modes of cultivation, makes one man's labor equal to that of half a dozen under the old regime, greatly increases the quantity and quality of farm products, and adds to the value of real estate. In these various ways the St. Louis Fair adds every year millions to the actual wealth of the western country; and its power of thus creating wealth, will continue to increase from year to year, as its influence extends to new communities and new neighborhoods.

SOCIAL INFLUENCE OF THE FAIR.

Nothing could be more auspicious than the social influence of the St. Louis Fair. It brings together many thousands of people from a vast expanse of territory—people from towns, cities and the rural districts—people of wealth, and people in moderate circumstances—farmers, merchants and mechanics, with their wives, sons and daughters—those from abroad, and those from St. Louis, mingling together on the Fair Grounds, in the amphitheater and the different departments, accidentally form acquaintances that frequently ripen into friendships, and these friendships into love, kindred and new families. It is the pleasant intercourse of strangers, induced by such great gatherings as this, which saves us from the curse of provincial clannishness, and makes us in language, dress, manners and habits of thought, essentially and emphatically one people. The belles and beaux from the granite hills of New England and the warm savannas of the South; from the Middle States, the Great Lakes of the North, and the gold fields of the Pacific meet here, and many a happy and life-long union follows; and every such event substitutes the ties of consanguinity for the blind and unreasoning prejudice of other years.

Farmers, merchants, mechanics and all classes of people thus drawn together, learn to know each other better and respect each other more; and as years roll on, the regular visitors to the Fair, that may be counted by scores of thousands, come back to it again and again, as to a place of happy re-union. This result of the Fair alone, is worth all the expense of conducting the institution.

INFLUENCE OF THE FAIR ON COMMERCE.

The currents of trade are always identical with the lines of travel. If you find a place where vast multitudes congregate, as at an ancient shrine, you may be sure to find a city animated with the life of foreign and domestic trade. You will also discover the great channels of domestic commerce by observing the radiating lines through which these multitudes approach the Mecca of their desires. It would be an interesting, and almost astounding exhibit, if St. Louis merchants and manufacturers could know just how much the Fair has done to augment their business. During the Fair week alone, purchases are made by country merchants, to the amount of several millions, and no inconsiderable portion of this might be drawn to other points, but for the superior attractions of the Fair. Every one loves to mingle business with pleasure in all his enterprises, and the coming to St. Louis to buy goods and attend the Fair, is an admirable way of accomplishing such a purpose. During the first days of the Fair, the fleet of steamers on the river, and the trains on nearly a score of railroads, come absolutely thronged with visitors from all parts of the United States, but, for the most part from the West and South. To-

wards the close of the week the great tide of humanity begins to ebb, and with the reflex wave go back cargoes and train loads of merchandise, and in this way our annual exhibition greatly increases the trade of St. Louis.

The Fair increases trade also by greatly augmenting the number of human wants. The poet says:

"Man wants but little here below,
Nor wants that little long."

But civilization increases the number of our wants, and commerce can alone supply this enlarged demand. The brave pioneer who first built his rude cabin in our western wilds had few wants beyond his gun and faithful dog. With these he could feed and clothe himself and family. But every advance in the scale of civilization increases the wants of such a family, and though the supply of many of these new wants may add nothing to the sum of their happiness, yet the fact is apparent, that the higher the grade of civilization, the more it costs to live; and as a general rule these demands of a higher civilization, when supplied, increase the happiness of individuals and communities. In this way the Fair increases both trade, and human comfort and happiness.

INFLUENCE OF THE FAIR ON MANUFACTURES.

In the last few paragraphs we have pointed to the influence of the St. Louis Fair, as greatly increasing the trade of St. Louis. For reasons already named it extends and increases home manufactures. The farmer comes here in October, and learns lessons of economy that he had never dreamed of. He finds a reaper that can harvest more grain in two or three hours, than he could cut with his cradle in a week. He sees a thresher that will outdo the bad work of a whole drove of tramping horses, and at a saving of expense as well as horse muscle. He finds plows, drills and cultivators that will enable him to double his crop without any increase of expense beyond the interest on the investment. He finds a thousand iron fingers that will enable his fingers of bone and muscle, directed by common sense, to accomplish ten times as much as they could unaided by such auxiliaries. He, at once, supplies his wants, and goes home a wiser and a wealthier man. The thousand mechanical industries of the country, from the hardy blacksmith at his forge, to the printer at his power press, are all the time seeing new improvements in the machines and implements of their varied callings, and these improvements can only be supplied by manufactures. Thus it is that the St. Louis Fair greatly increases the demand for manufactured articles of all kinds, and thus directly benefits all the mechanical industries of the country.

THE FAIR PROMOTES WESTERN INDEPENDENCE.

In this caption we speak of a pecuniary, and not of a political inde-

pendence—an independence secured by working instead of fighting. While a certain amount of dependence upon others is good for every individual, family, community or nation; too much of this quality is sure to result in base subjection, degradation, poverty and final pauperism. Every community, to be really prosperous, must be self-sustaining; it must be able to sell as much as it buys, and, taking the whole outside world together, should keep the balance of trade in its own hands.

To secure a grand result of this kind, there must be such a variety of occupation as will keep every hand employed; and, as nearly as possible, make every hand supply its own mouth. In the West we have millions of acres of unoccupied land, but it will not do for every one to become a tiller of the soil. While the West is the world's granary and agriculture its grand specialty, there must be other occupations and pursuits, or we shall be poor indeed. To secure the desired variety of occupation, we must change, as far as possible, our raw material into the thousand forms demanded by modern civilization—in short *we must manufacture.*

If we had no facilities, no conveniencies, no genius, no capital to do this kind of work, then we should be obliged as a matter of course, to send all our cotton, wool, hides, leather, &c., away to some other people who would take pleasure in putting them into shapes to suit our wants and wishes, charge us with freight both ways, make us pay various little charges in the way of freight, commissions, &c., and a good sound profit to the manufacturer besides.

This is the kind of dependence to be deprecated and avoided. It takes millions of our money to other countries, and leaves us thousands of hungry mouths and idle hands.

The St. Louis Fair has done much to produce a proper equilibrium in this matter. While it exhibited thousands of curious and useful things, many of which came from other cities that had made more progress in manufacturing than St. Louis, it proved plainly to all capitalists, that we had inexhaustable material, and illimitable, though dormant, force, to establish manufactures upon the largest scale. The result has been that already, millions of outside capital have sought investment here, and rapid progress is being made in almost every branch of mechanical industry. In this way the St. Louis Fair promotes western independence.

POLITICAL INFLUENCE OF THE FAIR.

The political influence of the St. Louis Fair, like its power in the social and commercial world, is only for good. It is one of the strongest bonds of union that could be invented. It is a perpetually recurring demonstration that the States and Territories of this great Valley, and of the whole West cannot be divided. Their relations of

interest, commerce, friendship and kinship, are so intimately interwoven that the break of a single thread brings ruin upon the whole beautiful fabric. Other States may fear revolution and disseverance, on account of opposing interests and bitter animosities; but the States of the great Valley never. When the mingled soil of twenty great Commonwealths, held in solution by the Mississippi river, can be separated and sent home, it will be time enough to think of revolution and the violent separation of States in this great division of the American Republic. And the same influence that makes the West true to itself, will make it true to the whole country. The American Republic never had, and never will have, stronger arms or braver hearts for its defence, than the millions that are found in the valleys, plains and mountains of the Great West.

THE FAIR INCREASES POPULATION.

It does this in two ways. First, by introducing a higher order of civilization, in which the laws of life and health are better understood. It is generally admitted that, though civilization introduces some diseases unknown to savages or barbarians, yet the medical science that comes with it brings new remedies, so that with the knowledge of medicine and of the laws of hygiene, more people come to maturity and live to old age, than with the rude and ignorant, or the real barbarians of our western wilds. Whole tribes of Indians have been destroyed by the small pox, while the same disease is rendered comparatively harmless by a simple preventive used amongst the people of an educated, intelligent community.

But the Fair increases the population of our city, State and neighboring States, by showing to visitors from the other side of the Alleghanies, and the other side of the Ocean, that our city and the vast surrounding country offer wonderful inducements to all enterprising, industrious farmers, mechanics, merchants and business men generally. Every annual exhibition brings some of the visitors at the Fair, to settle in St. Louis. Merchants, bankers, lawyers, doctors manufacturers, artisans, find here a wider field for their skill, and are induced to establish themselves in the metropolis of the West. Directly or indirectly, the same agency makes thousands of emigrants acquainted with the inducements offered to settlers by Missouri and other rich and fruitful States of the Mississippi Valley.

THE FAIR AS AN ADVERTISER.

Not amongst the least advantages of the St. Louis Fair, is its adaptedness to make known all that people desire to learn respecting St. Louis and the western country. It brings together the maker and user, the buyer and seller, our immediate neighbors and our visitors from a distance; and these meet under the most favorable circumstances. The Great West exhibits its wonderful productions to the

admiring eyes of strangers. The rich products of farm and garden, and vineyard, and mines of the useful and precious metals, as well as of workshops and factories, are all here, and each tells its story. The searcher for a new home finds a place to suit him, and the buyers of goods, wares, machinery, &c., find that St. Louis is just the place to supply their wants. Merchants, manufacturers, and business men generally of St. Louis, spend large amounts every year to secure the custom, which, from territorial proximity, belongs to this city. But better than all the agents, runners, drummers, and circulars is this simple medium of the St. Louis Fair. Its efficiency as an advertising medium is so much the greater, as it has no selfish purpose to accomplish. The multitudes assemble here from all quarters, they make new acquaintances, they see for themselves what inducements are offered for trade with St. Louis, and then govern themselves accordingly.

THE FAIR AS A HOLIDAY.

How well everybody remembers that old adage, "All work and no play makes Jack a dull boy." The homely couplet, of which this is the half, is full of sound philosophy. Holidays are sometimes carried to excess, but not in the United States. The only legal holidays we know are New Years and the Fourth of July. Christmas and Thanksgiving are gradually working themselves into the social system, and both will soon become national holidays, North and South. In the meantime, we have too few of these relaxations from manual or mental toil. Either mind or muscle, if kept too long strung up to a high tension, will give way, and the result will be more or less disastrous. The minds of men with us, are forever on the stretch—always on the lookout for the main chance, always striving for money or its equivalent, in houses and lands. The universal passion for money-making becomes a national characteristic, and some look upon us as worshippers of the "almighty dollar." While we had better err on this extreme than in the opposite of reckless extravagance, there is a golden medium as in all things, and he is the wisest man who finds and follows it. The St. Louis Fair comes just at the proper time for a holiday. With us in this climate, it is after all the summer harvests are secured. The wheat, rye, barley and oats have beeen gathered and sent to market long ago. The vineyards have poured their purple flood through the wine press; the orchards have matured their fruit, and stand ready to send their golden treasures to the market, and the vast cornfields—the great glory of the West—have ripened their millions of bushels to feed the stock at home, or supply the demand from abroad.

What more propitious time than this, to give ease to the mind, and spend a happy week in rational enjoyment at the great Fair? Such relaxation is no loss of time, but the days and the dollars spent, are

more than compensated by the knowledge gained, and the fresh energy induced into the whole system,—brain, muscle and all,—by a week's attendance on this grand exhibition of agriculture and the varied arts of civilized life.

LOCATION OF THE FAIR.

Some of the States have tried the experiment of itinerant Fairs. They farm out the State Agricultural Fair to the highest bidder, and it goes one year to a town in one extremity of the State, and the next year to another. The only advantage to be derived from this nomadic, or wandering characteristic is, that the Fair acts like a kind of home missionary, kindling up the spirit of progress in different sections, while the buildings erected by the town or county where the Fair is held, answer well for a local Fair afterwards. This practice may be very good for several years, but when the different sections of the State have been visited by the great industrial missionary, it will be better for the Fair to become stationary, and thus gain a local habitation and a name. If the St. Louis Fair had attempted to travel, it would have died long ago. Fortunately it is not a State or district institution, but like the city that gave it birth, is thoroughly cosmopolitan in its character. No locality could be better suited for a great continental Fair, than the immediate vicinity of St. Louis. Equally removed from the bleak winds and chilling frosts of the North, and the enervating heats of the semi-tropical South; possessing a mild and temperate climate—having easy and daily intercourse with the shores of the Atlantic and the Pacific, and being directly connected by rail or river, with every State and Territory in the great American Republic, St. Louis is not only centrally situated with regard to population and territory, but is the natural trade centre for the largest and richest agricultural district in the known world. Here are twenty great States and Territories stretching out to the North, South, East and West, containing more than one hundred millions of square miles, and nearly all this vast region is marvellously rich in agricultural or mineral products. Whether the Capital of the country shall ever come to the "future great city," or not, certain it is that something better than the Capital is already here, and that is the St. Louis Fair. This institution, still fostered and protected, still growing with the growth of the city, and sending out its ever increasing influence like a blessing, through all the ramifications of intercourse with the surrounding country, shall continue to bring greater benefits to St. Louis and the West, than any other means or agency.

THE FAIR AND THE PUBLIC PRESS.

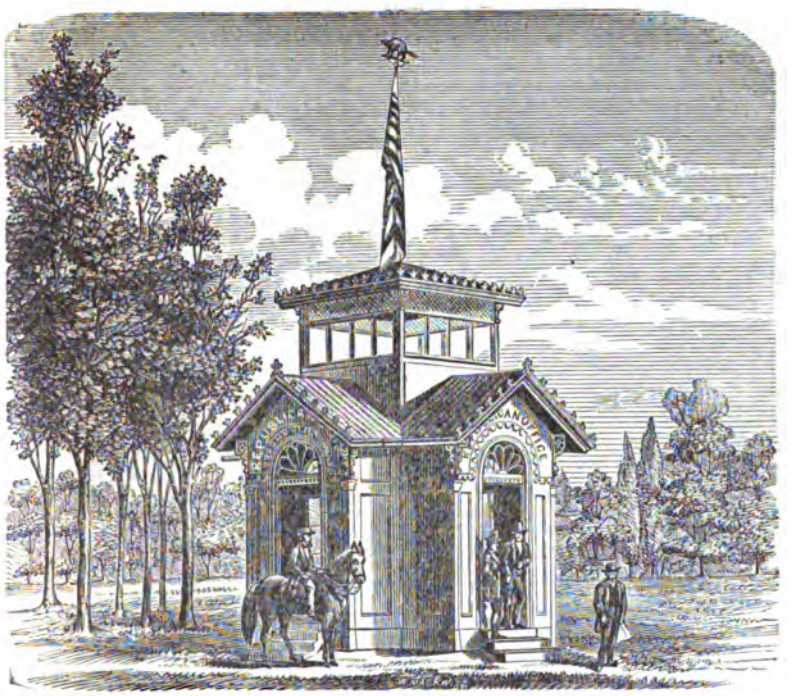
The originators, supporters and managers of the St. Louis Fair, being men of enterprise and intelligence, have always understood the value, importance and power of the public press; and the newspaper

press of St. Louis, has cheerfully and earnestly responded to the wishes of the Fair Association. Thus there has always been a feeling of mutual interest between the two. The prosperity of the Fair indicated the growing prosperity of the leading city papers, and the ever widening and increasing influence of the newspapers could be seen in the more triumphant success of the Fair. The friendly sentiments of the two are reciprocal and their interests identical. Both should aim to give greater prosperity and glory to the city and country that give them support.

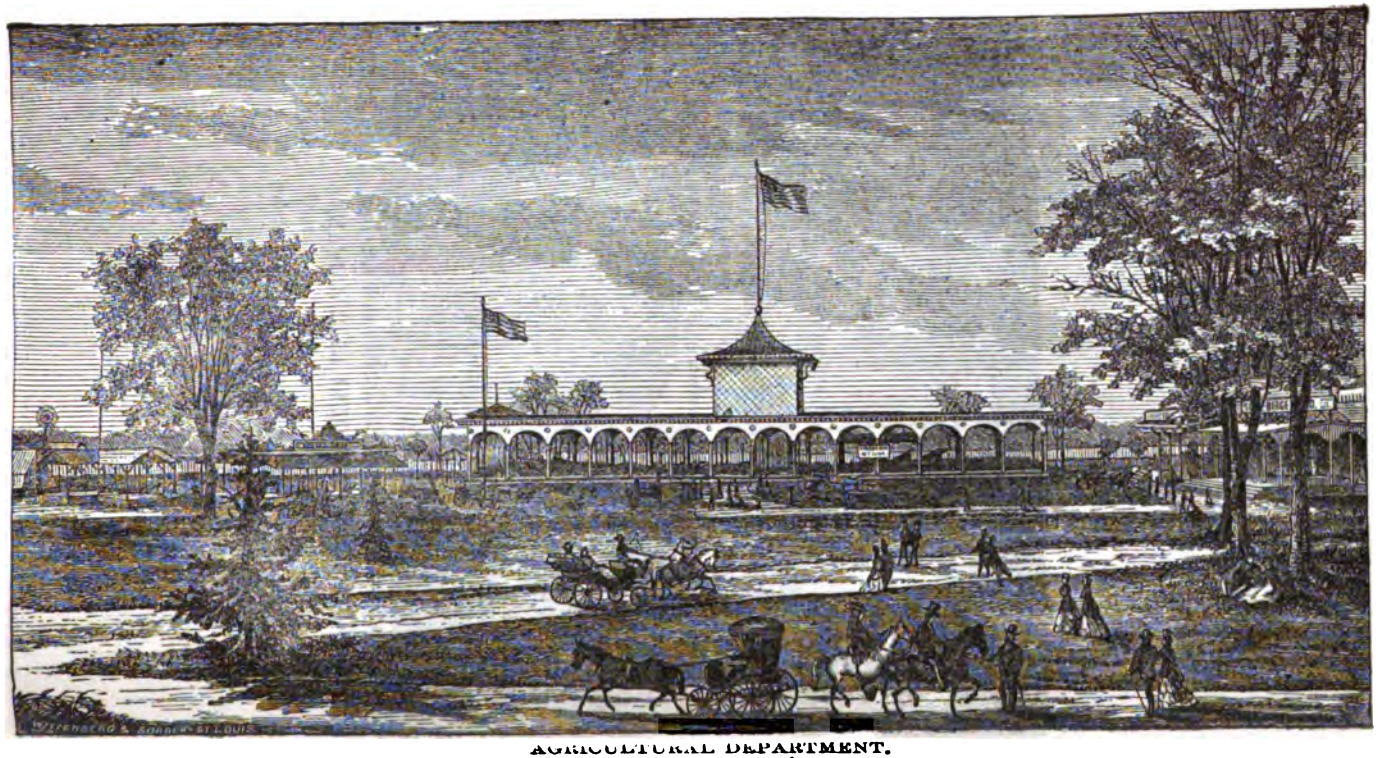
During the summer months the St. Louis papers are always willing to keep the public fully advised, through their columns, of the prospects of the approaching exhibition. Through this medium the whole country is kept posted with regard to all matters of interest pertaining to the Fair, and many thousands of both visitors and exhibitors are induced to visit the city and the exhibition.

During the Fair week the leading daily papers of the city have each, from five to twenty reporters at the Grounds throughout each day of the exhibition, and the full and complete details thus written up would make a good sized volume for every day during the first week in October.

Comfortable quarters have been assigned for the use of the members of the press, and superintendents, their assistants and exhibitors are generally prompt and cheerful in giving desired information. To supplement the facilities for making full and accurate reports of the Fair, from day to day, the *Missouri Republican, Missouri Democrat* and *St. Louis Times,* have each erected a small but neat and tasteful building on the Grounds, which is known as the Fair Office of the paper. Sketches of these buildings will be found upon succeeding pages. Other papers have tents or make use of the general press headquarters, for the convenience of their reporters.



FAIR OFFICE—MISSOURI REPUBLICAN.



AGRICULTURAL DEPARTMENT.

REPORT OF THE ELEVENTH ANNUAL FAIR

OF THE

ST. LOUIS
AGRICULTURAL AND MECHANICAL ASSOCIATION.

CLASS A.

AGRICULTURAL DEPARTMENT.

D. K. FERGUSON, SUPERINTENDENT,

The exhibitors at the Fair consider the Superintendent of this department the right man in the right place—one who devotes himself to the important duties devolving upon him, with an earnestness and energy worthy of all commendation. The Association have acted wisely in selecting for superintendents and managers, men who are familiar with all matters pertaining to their several departments, and are thoroughly inspired with devotion to the interests of the Fair. Mr. Ferguson is no exception to this good rule. He is ably assisted by his deputy, Mr. J. A. Billings.

The department of agricultural implements and machinery, might have been a more significant name, for this portion of the Fair exhibition, as it embraces just this class of objects. But a name is of little consequence where the thing itself is once understood. Perhaps there is no division or department of the great Fair, that shows more conclusively the rapid progress of the country, than this exhibition of agricultural and domestic implements and machinery. Every advance made in this field of inventive genius, is sure to make itself known every autumn, at the St. Louis Fair. As this department embraces such things as are most intimately connected with the well being and wealth of that vast multitude known as the farming community, ingenuity is always on the rack to contrive some machine or plan of operation that will make money and increase comfort by saving manual labor.

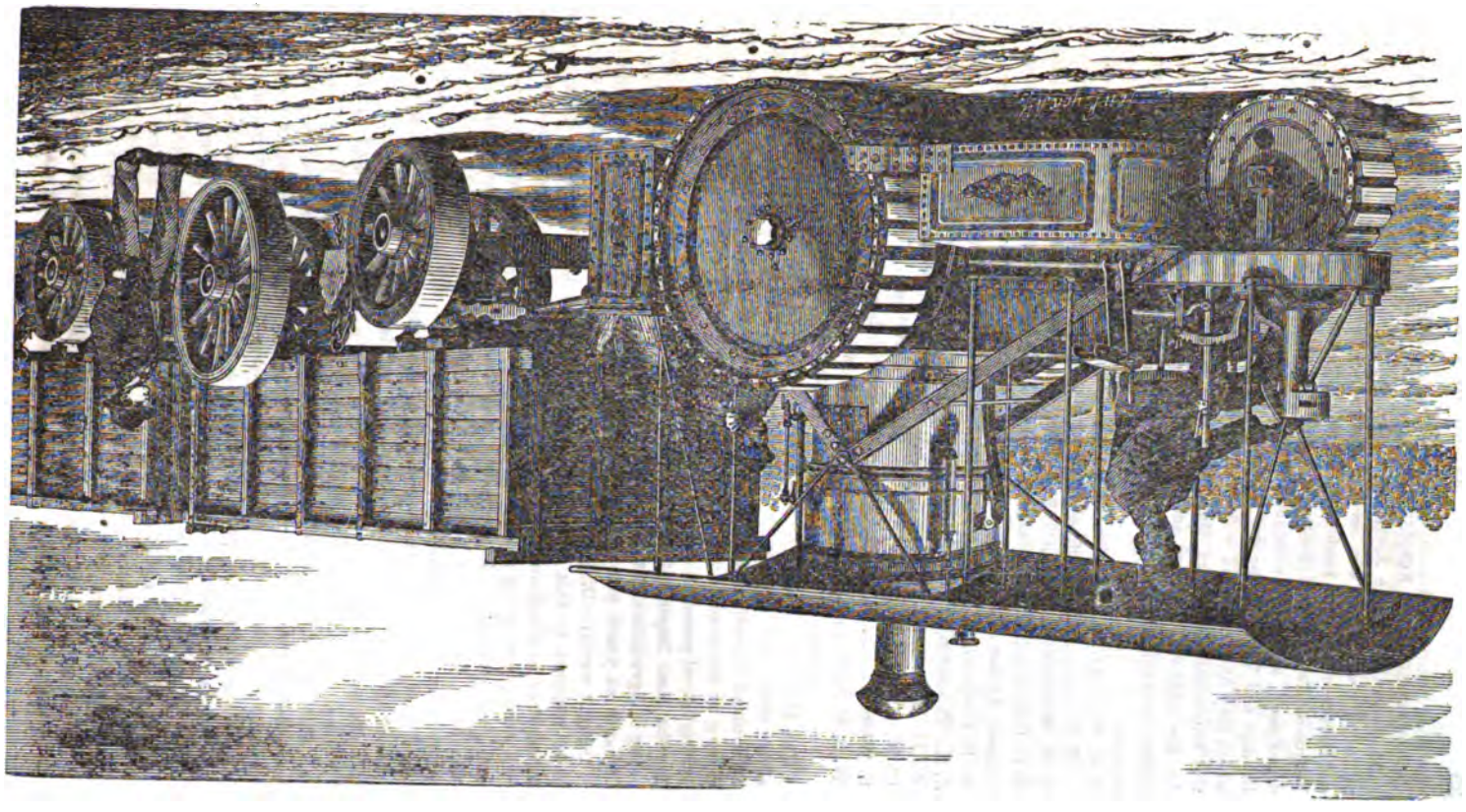
Peculiar circumstances have created a peculiar demand for such aids in the West. The waste of war and the entire change in the system of labor throughout the south and southwest, created a great demand for artificial aid to the farmer. Wherever it was possible,

we have hastened to substitute iron fingers for those of bone and muscle, that our grain and cotton fields might not go untended. The fresh demand for labor-saving implements and machinery, thus created, has added largely to the list of mechanical aids, and one man's labor on a farm, is equal to that of four or five, even twenty years ago.

When the St. Louis Fair was first inaugurated, sixteen years ago, this department was barely respectable in the number and variety of articles on exhibition. A few reapers, mowers, threshers, corn planters, corn shellers, and a few simple implements for the farm or garden, made up the staple of the show; and although creditable then, would be almost disgraceful now. The present exhibition embraces more than a thousand different articles, and you may find everything in the vast collection from a toy wheelbarrow and dog churn, all the way up through the very best kinds of tools and machines for the house, the garden or the farm, until it culminates in a road steamer and an immense gang plow.

The Association erected a large building for the use of this department, during the last summer, and devoted some fifteen acres of open ground surrounding the building to the same purpose. Several manufacturers of, or dealers in agricultural machinery, erected additional buildings for their special use, on these reserved grounds. Amongst these were Semple, Birge & Co., St. Louis; St. Louis & Peoria Plow Company; Whitman Agricultural Works, St. Louis; St. Louis Industrial Plow Company, St. Louis, Koenig & Co., St. Louis, and L. M. Rumsey & Co., St. Louis. In addition to these, some of the largest exhibitors had their grand displays, or a part of them at least, on the open ground attached to this department. Amongst these were Stewart & Needham, who took the first premium for best display of agricultural implements made in the United States; Barnum Kennett & Co., Champion Machine Co., Springfield O; St. Louis Machine Co.; Springfield Manufacturing Co. Ill.; H. Kuhleman, St. Louis; Kingsland & Ferguson, St. Louis; Huber, Gunn & Co., Marion O.; Joliet Manufacturing Co., Joliet Ill., and many other individuals, firms and companies. Visitors who had traveled much, and seen many Fairs, expressed their opinion that the exhibition in this department, embraced a greater variety of valuable implements and machines, than were ever collected at a Fair in the United States—and when that is said, we may safely add the world.

The Whitman Agricultural Works, named above, is an establishment only a year or two old, but conducted by young men of energy and enterprise, who are doing much to enable St. Loius to supply agricultural implements and machines to the vast and fruitful region of which this city is the commercial center. Their progress is recorded in the fact that they took the first premium for largest collection of agricultural machinery manufactured in Missouri.



COMPLIMENTARY RESOLUTION.

At a meeting of the Awarding Committee of Class A., it was resolved that our thanks are due and tendered to D. K. Ferguson, Esq., Superintendent of this department, and to his assistants, Messrs. Billings and Wheeler, for the manner in which they have arranged and conducted this important division of the Fair, and for the uniform kindness and courtesy shown to exhibitors, and to this Committee.

J. J. Squires,.....Jefferson Co., Mo.
J. C. Brant,.....Jefferson Co., Mo.
B. F. Wheeler.....Okolona, Miss.
S. C. Colt,.....Hartford, Conn.
Eugene Archer,.....Louisiana.
A. F. Bird,.....New Orleans.
J. K. Thompson,.....Louisville.
W. D. Moore,.....Hamburg, Ark.
G. W. Kinney,.....St. Charles, Mo.
S. Whited,.....Monroe, La.
W. S. McShan,.....Lee Co., Miss.

AWARDS IN CLASS A.

The Directory of the Fair Association show their just appreciation of this department by calling it "Class A," and placing at the head of their list the following liberal premium:

For the Most Important Invention Relating to Agriculture Patented within the last three years, provided the same be thought worthy—Diploma and $100.

In response to this offer there were twenty-two entries from different parts of the world, embracing some very important and valuable implements and machines. There were plows, corn and cotton planters, cultivators, steam plows, corn harvesters, gang plows, ditchers, sowers, mowers, reapers, threshers, &c., but above them all stood the celebrated Williamson Road Steamer, which attracted much attention from the fact of its supposed adaptation to plowing and other farm work on our western prairies. The committee awarded the premium to this machine, an engraving of which will be found on the preceding page.

Williamson Road and Field Steamer.—The Williamson Steamer is an American improvement upon the well known "Thompson Road Steamer," as constructed in Great Britain, and is perfectly adapted to the road and field service of this country. Owing to the compression of the patent elastic tires, sufficient adhesion is obtained with the drivers, without damage to the roadway. These tires also act as a spring, and thus save the machinery from injury when traveling over rough roads.

Wagons for transporting freight should be made with broad tires, mounted on springs, and with a capacity of four or five tons each. A train of four wagons will turn the sharpest curves with ease and certainty, all the wagons following in the track of the Road Steamer. Ordinary four-wheeled wagons, constructed for horses, can be used by substituting for the shafts a simple triangle-coupling. The consumption of fuel will vary with the nature of the roads and steepness of the gradients. When running with a full load behind them, and over average roads in fair condition, a consumption of three pounds of coal per mile for each ton of gross load may be reckoned,—the extremes being from two pounds to four pounds of coal per ton of gross load. The consumption of water will be about seven pounds for each pound of coal consumed. When wood is used for fuel, about two to three times the weight of coal will be required to do the same work. Thus an eight-horse power Road Steamer weighing six tons, making a total weight to be moved of twenty-four tons, will consume 24 x 3=72 lbs. of coal per mile on good level roads. On very hilly roads, the consumption may rise to 24 x 4=96 lbs. per mile. In practice this size of Steamer has been found to require about one half ton of coal per day's work of ten hours.

When used for field service, the "Thompson Patent Wheells" enable this Steamer to cross any ordinary field without injurious compression of the soil, the great bearing surface of the rubber tires distributing the weight of the Steamer so as not to exceed the pressure of the hoof of an average horse. The Steamer can be steered perfectly, and can turn at the end of the field as quickly and in as little space as horses.

The largest and best Display of Agricultural Implements, made in the United

States.—1st prem. dipl. and $200; 2nd prem. $100; 3d prem. $50. Six entries.

The 1st prem. was awarded to Stewart & Needham St. Louis; the 2nd to Semple, Birge & Co. St. Louis, and the third L. M. Rumsay & Co. St. Louis.

The largest and best Display of Agricultural Implements made in Missouri.—Three entries under this head; 1st prem. dpl. and $30, awarded to Whitman Agricultural Works, St. Louis.

Combined Cotton Planter and Cultivator.—Honorable mention to Nathan Earlywine, Centerville, Iowa.

Harrow.—Nine entries; 1st. prem. dpl. and $5, J. O. Brien & Bro. Illinois; 2nd prem. medal, P. E. Frederick, St. Louis.

Corn Cultivators.— Sixteen entries, 1st prem. dpl. and $10, Stewart & Needham, St. Louis; 2nd prem. medal, Wm. Koenig & Co., St Louis, Deer & Co., makers.

Corn Planters.—Eleven entries; 1st prem. dpl. and $10, Van Vier Corn Planter, Quincy, Ill; 2nd prem. medal, Jos. Selby & Co., Illinois.

Corn Planter and Self Dropper.—Six entries; 1st prem. dpl. and $10; Jos. Selby & Co., Peoria, Ill.; 2nd prem. medal, T. H. Smith, Clyde, N. Y.

Corn Harvester.—1st. prem. dpl. and $10, H. Newman, Springfield, Ill.

Sulky Plow.—Five entries; 1st prem. dpl. and $5, Decatur Agricultural Works, Stewart & Needham, St. Louis, exhibitors; 2nd prem. medal, Robt. Newton, Jerseyville, Ill., Semple, Birge & Co., St. Louis, exhibitors.

Grain Drill.—Eight entries; 1st prem. dpl. and $5, St. Louis and Peoria Plow Co.; 2nd prem. medal, Wuesthoff & Gats, Dayton, Ohio.

Broadcast Sower.—Three entries; 1st prem. dpl. and $5, Barnum, Kennett & Co., St. Louis; 2nd prem. medal, Jno. Dodds & Co., Dayton, Ohio.

Corn and Cotton Planter.—Honorable mention to Peter Kling, St. Louis.

Corn Planter and Driller.—Honorable mention to Koeiler & Co., Camp Point, Ill., exhibited by H. Kuhleman, St. Louis.

Cornstalk Cutter.—Honorable mention to H. A. Patts' Sons, Chicago.

Check Rower.—Honorable mention to Hayworth & Sons, Decatur, Ill.

Best Collection of Agricultural Steel and Iron.—Honorable mention to A. J. Nellis & Co., Pittsburg, exhibited by Semple, Birge & Co.

Cotton Planter.—1st. prem. dpl. and $5, Nathan Earlywine, Centerville, Iowa.

Cotton Scraper.—2nd prem. medal, Industrial Plow Company, S. Louis.

Cotton Gin.—1st prem. dpl. and $10, Semple, Birge & Co., St. Louis.

Condenser for Gin.—1st prem. dpl. and $10, Semple, Birge & Co., St. Lonis.

Cotton Planter and Chopper.—Honorable mention to A. K. Nixon, Polo, Ill.

Mishwakie Steel Plows.—Honorable mention to St. Joseph Manufacturing Co., Mishwakie, Ind.

Sulky Hay Rake.—Nine entries; 1st prem. dpl. and $10, Stewart & Needham, St. Louis; 2nd prem. medal, John Dodd & Co., Dayton, Ohio.

Hay Gatherer.—Five entries; 1st prem. dpl., Decatur Agricultural Works, exhibited by Stewart & Needham, St. Louis.

Revolving Hay Rake.—Four entries; 1st prem. dpl. and $5, Stewart & Needham, St. Louis; 2nd prem. medal, Huber, Gunn & Co., Marion, Ohio.

Hay Derrick.—Three entries; 1st prem. dpl., Stewart & Needham, St. Louis.

Corn Sheller.—Eight entries; 1st prem. dpl., Whitman Agricultural Works, St. Louis.

Corn Sheller, Cleaner and Separator.—Six entries; 1st prem. dpl. and $10, Joliet Manufacturing Company.

Horse Power for Farming Purposes.—Nine entries; 1st prem. dpl. and $5, Whitman Agricultural Works; 2nd prem. medal, Geo. L. Squire & Bro., Buffalo, New York.

Corn and Cob Mill.—1st prem. Diamond Mill Co., by L. M. Rumsay & Co., St. Louis; 2nd prem. medal, Barnum, Kennett & Co., St. Louis.

Fanning Mill.—Nine entries; 1st prem. dpl., Nathan Kihle, Melton, Ill., exhibited by Samuel Hayden; 2nd prem. medal, J. L. Runks, Nashville, Tenn.

Wind-Mill.—1st prem. dpl. and $10, Hayen & McCartney, Fon Du Lac, Wis.; 2nd prem. medal, Semple, Berge & Co., St. Louis.

Clover Seed Cleaner.—1st. prem. dpl., Barnum, Kennett & Co., St. Louis.

Hay and Straw Cutter.—Ten entries; 1st prem. dpl. and $10, Stewart & Needham, St. Louis.

Portable Boiler and Furnace for Farm Purposes.—Five entries; 1st prem. dpl. and $10, D. D. Anderson, Kewanee, Ill.; 2nd prem. medal, Inman & Withington, Jaynesville, Wis.

Drag Saw-Mill.—1st prem. dpl. and $10, Whitman Agricultural Works, St. Louis; 2nd prem. medal, E. Totman, Batavia, Ill.

Stump Extractor.—1st. prem. dpl. and $10, Stewart & Needham, St. Louis; 2nd prem. medal, to same, McKinney, Potter & Co., makers.

Farm and Stock Pump.—Eight entries; 1st prem. dpl. and $10, Stewart & Needham, St. Louis; 2nd prem. medal, to same, McKinney, Potter & Co., makers.

Plow Clevis.—1st prem. medal, Stewart & Needham, St. Louis.

Farm Gate.—Five entries; 1st prem. dpl. and $10, W. C. Hooker, Abingdon, Ill.; 2nd prem. medal, P. Phillippi, Cass Co., Ill.

Garden Wheelbarrow.—1st prem. dpl., Whitman Agricultural Works, St. Louis.

Bee Hive.—Ten entries; 1st prem. dpl. and $5, Thos. Atkinson, Indianapolis; 2nd prem. medal, Isaac Fisher, St. Louis.

Churns.—Nine entries; 1st. prem. dpl. and $5, Cheever, Burchard, & Co., St. Louis, for W. P. Emmert, Freeport, Ill.; 2nd prem. medal, J. W. McClure.

Clothes Dryer.—1st prem. L. B. Walker, St Louis.

Portable Fence.—1st prem. medal, W. W. Sherman, Wentzville, Mo.

Horse Hay-Fork.—1st prem. dpl. and $5, A. J. Nellis & Co., exhibited by Semple, Birge & Co.

Hay-Forks 1-2 Dozen.—1st. prem. dpl., L. M. Rumsay & Co., St. Louis; 2nd prem. medal, St. Louis Machine Co.

Manure-Forks 1-2 Doz.—1st prem. L. M. Rumsay & Co., St. Louis.

Shovels.—1st. prem. L. M Rumsay & Co., St. Louis.

Hoes.—1st prem. dpl., Stowell & Tilson, Quincy, Ill.; 2nd prem. medal, L. M. Rumsay & Co., St. Louis.

Pruning Shears.—1st prem. dpl., Wm. Seagerson; 2nd prem. medal, L. G. Pardee, Kirkwood, Missouri.

Bush Scythes.—1st. prem. L. M. Rumsay & Co., St. Louis, Auburn Manufacuring Co., makers.

Post Auger.—1st. prem. dpl., Stewart & Needham, St. Louis.

Potato Digger.—1st. prem. L. M. Rumsay & Co., St. Louis.

Plantation Wagon.—1st prem. dpl. and $10, Studenbaker Bros., South Bend, Ind.

Road Scraper.—Five entries; 1st prem. Chicago Scraper & Ditcher Co., exhibited by Barnum, Kennett & Co., St. Louis.

Farm Wagon.—Six entries; 1st prem. and $10, Studenbaker Bros., South Bend, Ind.

The following articles received "Honorable mention," from the awarding committee in this department.

Patent Vise.—W. Seagerson, St. Louis.

Field Roller.—J. W. Van Haesen, Macon, Ill.

Bucksaw Frame.—L. Hancock, Alton, Ill.

Water Elevator.—G. M. Brunell, St. Louis, and Isaac Mayfield, Mayfield, Ky.

Cutting Box.—Brayley & Patterson, Chicago.

Cornstalk Cutter.—Babcocok & Stilson, Galesburg, Ill.

Power Corn Husker.—Hill & Hoag, New York.

Grain Binder.—A. Phillippi, St. Louis.

Attachment to Corn Cultivator.—M. P. Simpson, Taylorsville, Ill.

Set of Gearing.—Stewart & Needham, St. Louis.

Evaporator.—G. L. Squire, Buffalo, New York.

Combined Planter and Cutter.—Burr, Runstattler & Co., Peoria, Ill.

Model for Cotton Press.—B. F. Wheeler, Okolona, Miss.

Combined Agricultural Machine.—L. Leehman, Monroe, Ill.

Display of Baskets.—G. M. Fleming & Co., St. Louis.

Grader and Ditcher.—Prescott, Edwards & Co., Chicago, Ill.

The following articles were entered simply for exhibition, and did not compete for premiums of any kind.

Reapers and Mowers Combined.—Eight entries.

Mowers.—Ten entries.

Stump Puller.—One entry.

Threshers.—Eleven entries.

Lawn Mowers.—Three entries.

Plows.—Four entries.

Mower and Reaper Knives.—Four entries.

Reapers.—Three entries.

Field Rollers.—Two entries.

Cultivators.—Three entries.

Farm Wagons.—Two entries.

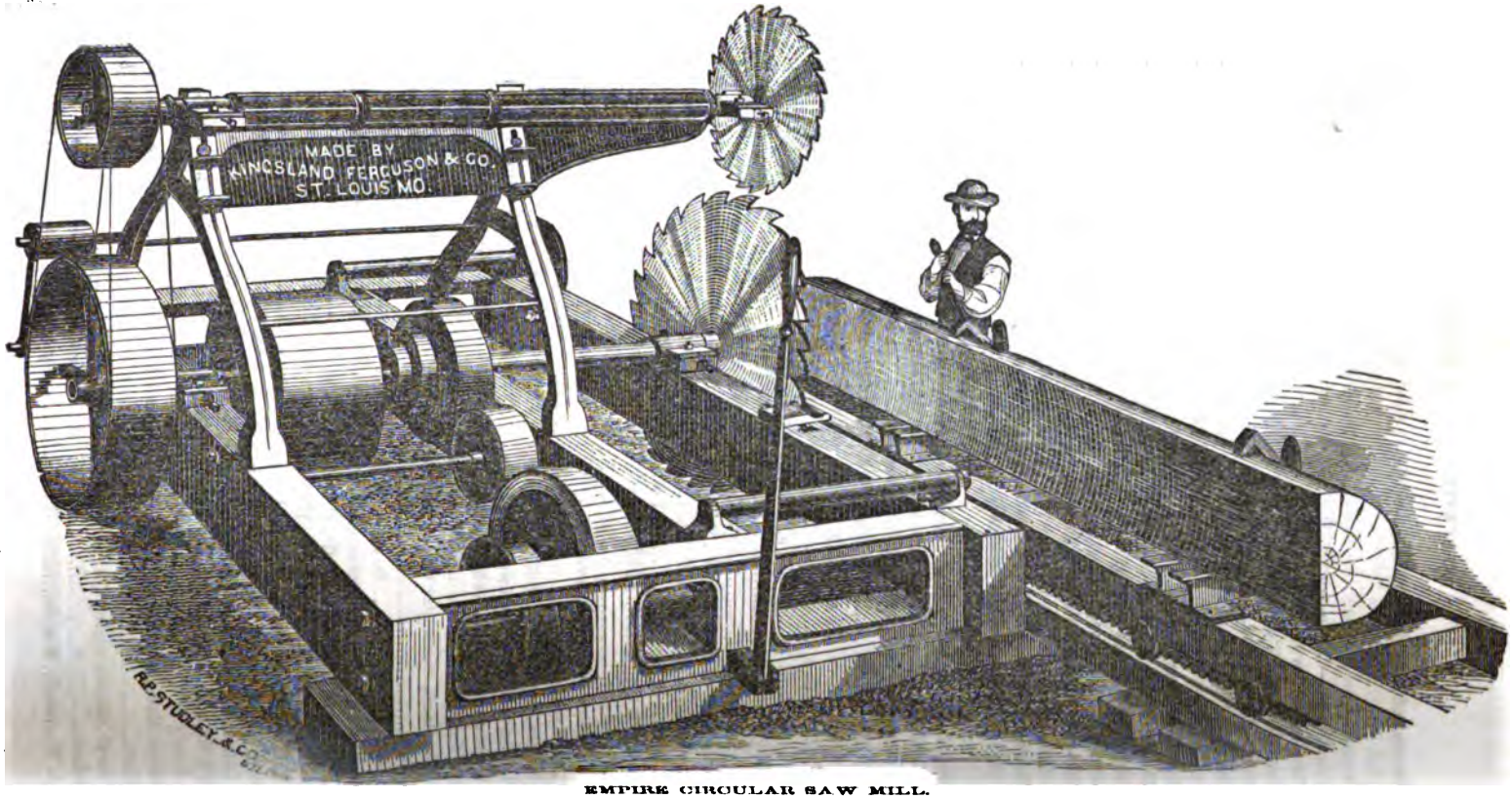
Cider and Wine Mills and Presses.—Fourteen entries.

Washing Machines.—Ten entries.

Clothes Wringers.—Four entries.

EXHIBITORS IN CLASS A.

Nathan Earlywine,.....Centerville, Iowa.
J. B. Bradford,.....Columbus, Iowa.
J. W. McCartey,.....Henderson, Texas.
Hills & Hay,.....New York City.
S. R. Nixon,.....Polo, Illinois.
Von Phul & Millon,.....St. Louis.
E. Garr,.....Atchison, Kansas.
J. E. Hayner & Co.,.....
Stewart & Needham,.....St. Louis.
Whitman Agricultural Works,...St. Louis.
Barnum Kennett & Co.,.....St. Louis.
L. M. Rumsay & Co.,.....St. Louis.
Bodine Hill & Co.,.....Jefferson City.
P. E. Fredericks,.....St. Louis.
Peekskill Plow Works,...Cleveland, Ohio.
St. Louis Machine Co.....St. Louis.
W. M. Coventry,.....Holden, Illinois.
J. O. Brian & Bro.,.....Kawania, Illinois.
N. C. Thompson,.....Rockford, Illinois.
King & Hamilton,.....St. Louis.
Sycamore Marsh Harvester Co., Sycamore Illinois.....
Jno. Dodds & Co.,.....Dayton, Ohio.
Wehl Plow Company, Monmouth, Illinois.
M. P. Simpson,.....Taylorsville, Illinois.
Babcock & Stilson,.....Galesburg, Illinois.
Maline Plow Company,....Maline, Illinois.
Mitchell Harper & Co.,....El Paso, Illinois.
St. Louis and Peoria Plow Co.,..St. Louis.
Deer & Co.,.....
W. Koenig & Co.,.....St. Louis.
Sandwich Manufacturing Co., Sandwich, Illinois.....
St. Joseph Manufacturing Co., Mishwakie, Indiana.....
J. A. Woodward, Warsaw,.....Illinois.
Springfield Manufacturing Co., Springfied, Illinois.....
H. L. Batchellor,.....Sterling, Illinois.
G. W. Brown,.....
Hearst Dunn & Co.,.....Peoria, Illinois.
Koeller & Co.,.....Camp Point, Illinois.
Henry Kirkham,.....Camp Point, Illinois.
D. W. Marks,.....Shelbyville, Illinois.
Barnard & Leas,.....Maline, Illinois.
L. Leckman,.....Monroe, Illinois.
J. Selby & Son,.....Peoria, Illinois.
Decatur Agricultural Works, Decatur, Illinois.....
Barr Rumsledler & Co., Peoria,...Illinois.
J. B. Wait,.....Grand Rapids, Michigan.
L. Schafield,.....Watertown, Wisconsin.
Y. H. Smith,.....Clyde, New York.
A. B. Pearson,.....St. Louis.
George B. Vaughn,...Marshall, Missouri.
H. H. Gibson,.....Quincy, Illinois.
Robert Newton,.....Jerseyville, Illinois.
R. Hampton & Co.,...Donaldson, Illinois.
Root & Pratt,.....St. Louis.
J. Strayger & Co.,.....
D. E. McSherry,.....St. Louis.
Wensthatt & Gats,.....Dayton, Ohio.
Keystone Manufacturing Co., Sterling, Ohio.....
Peter Kling,.....St. Louis.
H. Dyer & Co.,.....Fort Scott, Kansas.
H. A. Pait's Sons,.....Chicago, Illinois.
Hayworth & Sons,.....Decatur, Illinois.
A. J. Chadis & Co.,.....Pittsburgh, Penn.
Haslett & Woodfolk,.....Vicksburg, Miss.
J. D. Henry, Clarksville,.....Missouri.
E. S. Halloway,.....Columbiana, Ohio.
Gamman & Doering,.....Chicago, Illinois.
Coats, Gray & Co.,.....Allianee, Ohio.
B. E. Taylor,.....
H. Kuhleman & Co.,.....St. Louis.
W. Louden,.....Fairfield, Iowa.
Stratton & Faust,.....Evansburg, Penn.
O. S. Jarvis,.....Clay Co., Illinois.
Huber, Gunn & Co.,.....Marion, Ohio.
Brennan & Co.,.....Louisville, Kentucky.
W. D. Leavitt,...New Orleans, Louisiana
W. H. Curtin,.....
Empire Lead Mining Co.,.....Sterling, Ill.
Joliet Manufacturing Co.,.Joliet, Illinois.
Edsell Totman,.....Batavia, Illinois.
Hanlon & Conner,.....Alton, Illinois.
Sarger & Co.,.....
J. Brayner,.....Buffalo, New York.
G. L. Square & Bro.,..Buffalo, New York.

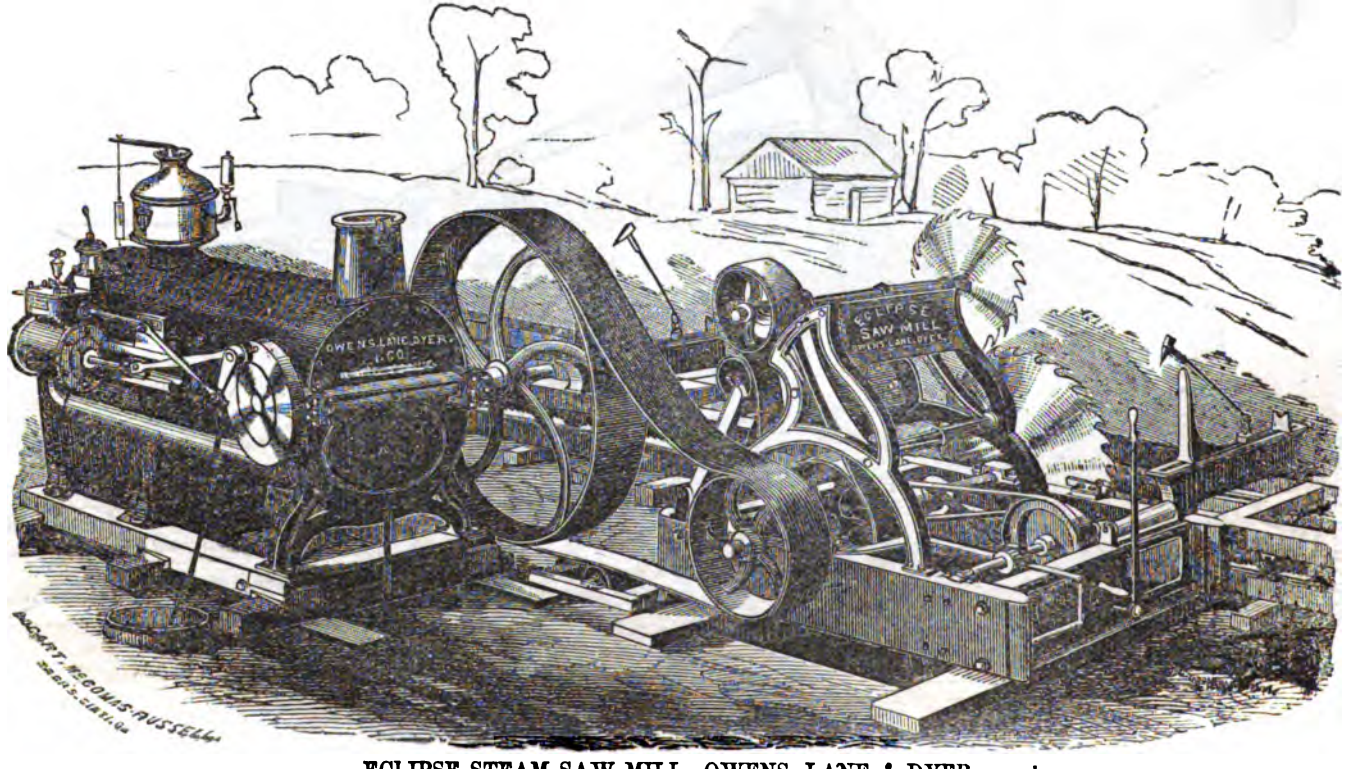


EMPIRE CIRCULAR SAW MILL.

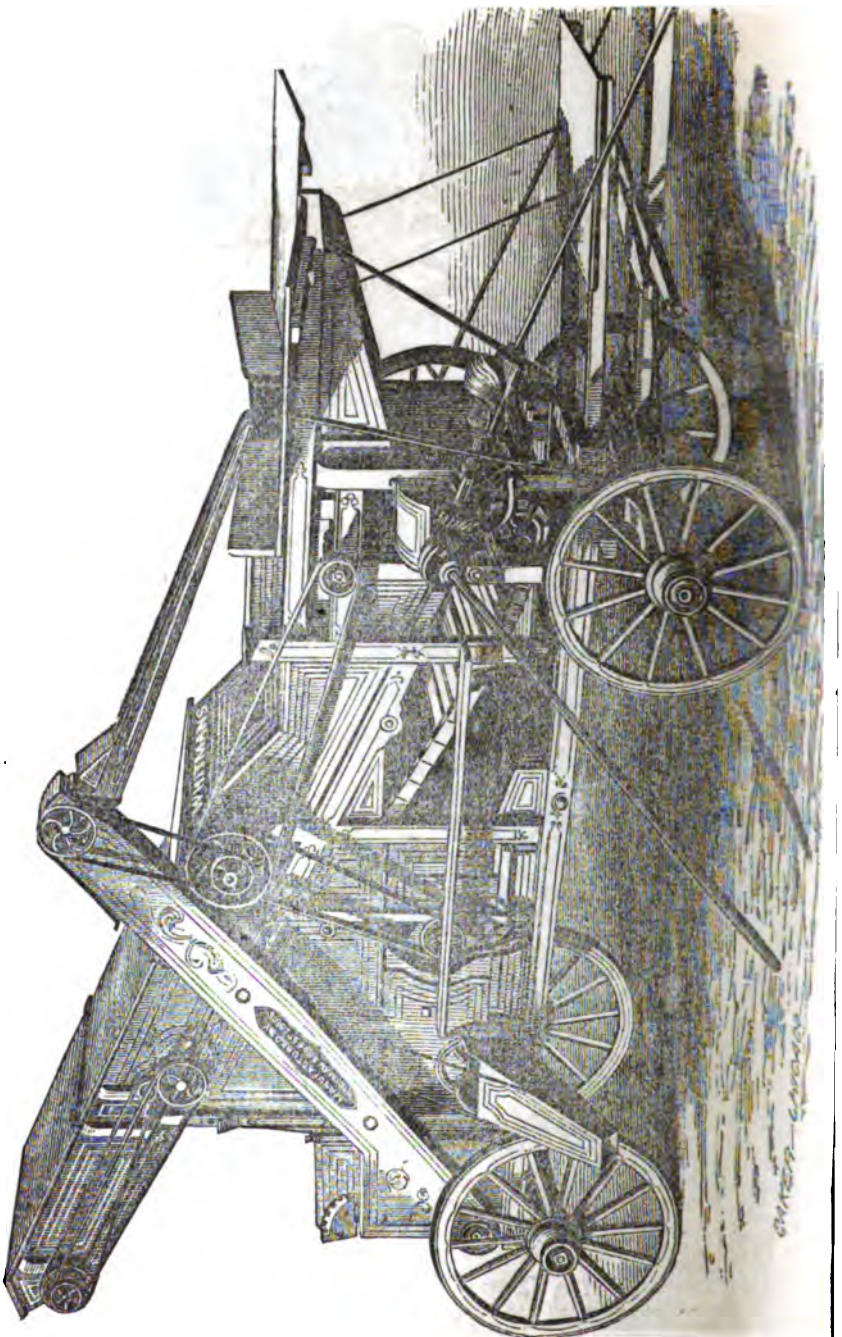
ST. LOUIS INVINCIBLE VIBRATOR THRESHER—KINGSLAND & FERGUSON.

KOENIG & CO., ST. LOUIS.

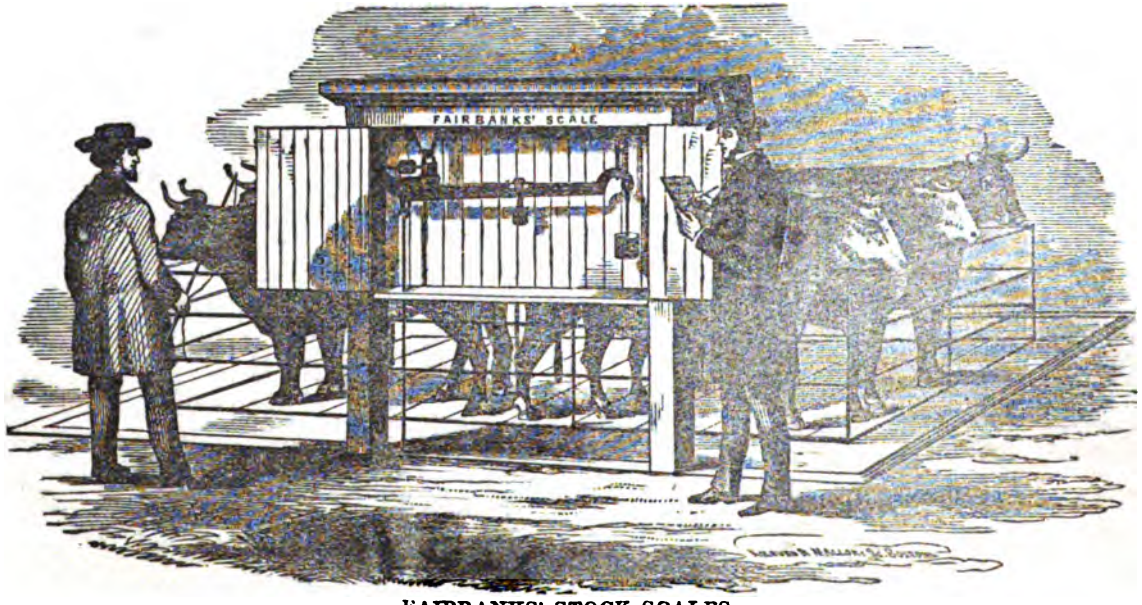
The BUCKEYE with L. MILLER'S IMPROVED TABLE RAKE. Side View.



ECLIPSE STEAM SAW MILL—OWENS, LANE & DYER.



WHITMAN'S IMPROVED THREE HITCH SEPARAT)
(Whitman Agricultural Works S . Louis.)



FAIRBANKS' STOCK SCALES.

MACHINERY AND MECHANICAL DEPARTMENTS.

CLASS B.

MACHINERY DEPARTMENT.

GERARD B. ALLEN, SUPERINTENDENT.

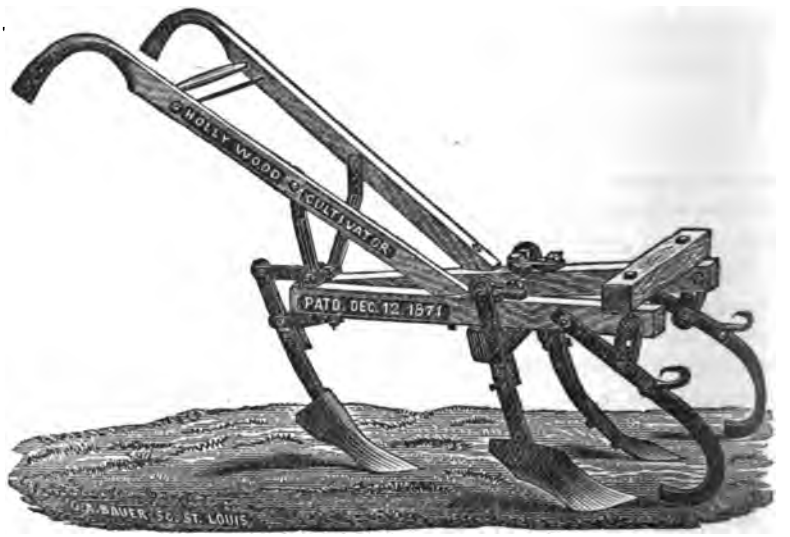
This very important division of the great exhibition, like most other departments, this year, was overrun with entries. The large building, erected a few years since, and supposed to be spacious enough to meet all future demands, was completely filled, as well as the space around it, with hundreds of machines, from the most delicate to the most powerful. In one corner were located some beautiful machines, with young ladies to attend them, that were all the while turning out infinitesimal screws, pins, wheels, &c.,—the component parts of a perfect American chronometer; while in another part of the building, the great iron arms of a mechanical Titan, were swinging round and round with the power of a whole regiment of giants.

This department well deserves the prominence given to it at the St. Louis Fair. Modern civilization owes its wonderful progress to machinery more than any one thing else. The busy brain of the inventor, and the cunning hand of the artisan, have together wrought a wonderful revolution in the world of art.

"When Adam delved and Eve span," a sharp stick must have been the only cultivator, and thorns the only sewing machine. For long ages in the world's history but little real progress was made in machinery or the mechanic arts. The rudest and most primitive contrivances were in use amongst civilized nations down to within a century of the present time. We may even now find Italian peasants spinning from a distaff without a wheel, giving the twist by a twirl of the bobbin, just as they did five thousand years ago.

But the past century has done more to invent and perfect machinery and mechanical contrivances, than all the ages of the world before. What wonderful advancement has come with the steam engine and the telegraph—the power looms, cotton gins, spinning jennies, reapers, threshers and a hundred other inventions. The fact is, this may be called an age of machinery—an age in which almost everything is done by some kind of machine or mechanical contrivance. In the whole circle of agriculture and the useful arts, scarcely anything is done without machinery. By machinery we saw down large forest trees, and then make them into timber, plank, boards,

shingles, staves, &c. By machinery we extract the huge stumps from the ground, and thus prepare it for cultivation. By machinery we plow and sow, and reap and thresh, and then grind the grain that is produced. By machinery the thrifty housewife spins and weaves, sews and knits, makes butter and cheese, and performs many other things in the line of domestic industry. By machinery we produce almost every object of art that surrounds us in our every day life. We build houses, we make furniture, we manufacture cloth, we make boots, shoes and hats, we make jewelry, we make books, maps and newspapers, we build bridges and railroads, we bore through mountains of granite, we dig into the bowels of the earth, we navigate rivers, lakes and oceans, we dig down the mountains and fill up the valleys, we build great cities and people whole continents, in short we elevate, civilize and christianize the whole world by the aid of machinery.



HOLLYWOOD CULTIVATOR—VON PHUL & SONS, ST. LOUIS.

(Transferred from Class A.)

AWARDING COMMITTEE.

Alex. Crozier,.....St. Louis.
R. C. Ludlow,.....St. Louis.
C. W. Dorelle,.....St. Louis.
Chas. R. Anderson,.....St. Louis.
Joel F. Allison,.....St. Louis.
Henry Reihl,.....St. Louis.
Jas. E. Loomis,.....St. Louis.
V. Weismantel,.....Bellville, Illinois.
J. Begga,.....St. Louis.
T. W. Seymour,.....St. Louis.
Hugh Reed,.....St. Louis.
W. R. Pritchard,.....St. Louis.
J. H. McCord,.....St. Louis.
W. C. Turner,.....St. Louis.

The following is a list of exhibitors and articles in Class B.

G. & W. Todd have on exhibition four sizes of their French burr-mill stones; "improved Ingram," or California separator, combined, manufactured and sold by M. Deal & Co., Bucyrus, Ohio, patented; combined smutter and separator, Barnard & Teas, manufacturers, Moline, Illinois; "Eureka" smut and separating machine, manufactured by Howe, Babcock & Co., Silver Creek, Chautauqua County, New York, patented February 22, 1859, also renewed in 1864, and again in 1865. The same machine was patented in Great Britain in 1868, and in France in 1869. They also exhibit Barnard & Teas' flour packers, large and small. Also, G. B. Turner's improved smut and separator, manufactured by Turner, Park & Co., Cuyahoga Falls, Ohio, large and small sizes; Richards' smut machine, and grain scourer, manufactured at Lockport New York. Portable flouring mill, two sizes. Eclipse double turning water mill, three sizes, manufactured by Stilwell & Bierce, Dayton, Ohio. Two sizes improved flour bins. Not least of the articles attracting attention is Brackett & Brown's grain meter, patented Nov. 16, 1869. The display by the Messrs. Todd is very creditable. Mr. H. F. Randle, of Paducah, Kentucky, has on exhibition a shingle machine, manufactured by J. H. Johnson & Co., patented Sept. 13, 1870.

Steam pumps are next in line near Todd's display, of all sizes. The Northwestern Co. of Monmouth, Illinois; exhibitor, H. J. Graham; John Kupferle & Co., of this city, who have on exhibition twelve sizes of horizontal and portable engines, as well as twelve Spears' steam pumps, two fly-wheel pumps to work by hand and steam. The patentee of the engines and pumps manufactured by Kupferle & Co., is A. S. Cameron, of New York.

The Mississippi Valley Manufacturing Company exhibits six varieties of steam pumps, horizontal and vertical; also the "Eureka" pump, guaranteed to suck 25 feet and force water from 75 to 80 feet; also the self-steam regulator.

A finely finished steam fire engine of the Latta pattern, of Cincinnati, appears near the entrance.

To the left of the door, as you enter from the south side, a Potter cylinder printing press is in operation, run by Woodward & Tiernan; and next to them, on the right, is a woollen-spinning machine, with the Brothers' self-operating jack attachment, exhibited by Enos Bowen, & Co., of Chicago, Illinois, and manufactured by E. C. Cleveland, of Worcester, Massachusetts. The exhibitor claims that his machine is so far superior to any other now in use, that a boy or girl can produce more yarn by from 30 to 40 per cent. than a man could in the old-fashioned way, and furnish a better article. C. J. Russell, of Chicago, Illinois, has on exhibition a very ingenious machine for making spiral stair-rails or frame work.

Casimer Amsler has a machine, with two different saws, by which he can cut all descriptions of scroll-work out of wood, no difference in regard to its grain or formation. One of his saws is circular, and the other perpendicular.

Another novelty appears in the form of a lame soldiers' wagon by which the crippled can propel himself. It is on exhibition and is manufactured by G. Matlmiller, of Havana, Illinois.

Curtis & Co., 117 Vine street, make a very fine showing of saws, sub or circular gangs, muleys, cross-cuts and drags.

Haeger & Brown, No. 717 N. Second street, St. Louis, have on exhibition a fire regulator and smoke consumer and blower, now in use at the St. Louis flouring mill.

A. S. Petticrew, of St. Louis, exhibits

a large number of steam machines, among which may be enumerated stationary and portable engines, circular saws, flour mill machinery, wood-working and carving machines.

F. B. Corbin, of St. Louis, has on exhibition a test steam gauge, of sixteen sizes, so as to suit any description of steam engine; Hibbard's railroad springs, with steel rubber centre, for railroad cars, as well as other articles of St. Louis manufacture.

Oat separator by Turner, Parks & Co., said to be equal to the best wheat smut mill.

Next comes Crompton's fancy loom with the new horizontal harness motion, exhibited by Enos Bowen & Co., Chicago, Illinois.

H. A. Barnard makes a very fine display of wheat separating machines, the best of which is the one patented July 5, 1865, and exhibits Nos. 1, 2 and 3 in size.

A. Newton & Co., agents at New York and Chicago, exhibit the Starratt's patent American meat and vegetable chopper, manufactured at Athlone, N. Y., six sizes.

Bates & Son, of Dayton, Ohio, have a blacksmiths' hand drill, W. H. McLeland, exhibitor; also a gauge for setting axles for carriage or wagon wheels.

Reed & Bowers have a combined shear, punch and upsetter—to cut, slash, crash or do almost anything with a piece of cold iron. It was patented October 2, 1867, from Greenville, Conn.

Smith, Beggs & Co., have a spoke-turning machine, manufactured by Silmer & Deming, Salem, Ohio; also a hub borer and iron drill, four sizes.

Next comes a "planer, tonguer and groover combined," from Buffalo, N. Y., patented May, 21, 1871, and exhibited by E. C. Hatlidge, of St. Louis.

Mr. Sam. Church exhibits a contrivance to make blind slats, so as to prevent burglars from operating on the outside in any attempt to break into a house through the window shutters.

From Ames' works is a stationary engine, and two on wheels are on exhibition —the stationary being used to drive the machinery in operation in the department.

Miner's alarm water gauge attracted considerable attention. The inventor is a citizen of St. Louis.

E. H. Ross had a lithographing press at work, striking off maps of St. Louis city and suburbs.

The buildings north of the main one, are occupied respectively by Owens, Lane & Dyer, and by Kingsland & Ferguson, Collins & Holiday and D. G. & W. Todd.

Rice & Anderson's, of Quincy, Illinois, "Mastodon stone-dresser." This machine cuts and dresses an ordinary sized limestone rock in twenty minutes, which would require the labor of one man an entire day.

Smut machine, invented and patented by Valentine Weismantel, of Belleville, Illinois—a home article which attracts much attention.

National Watch Company, of Elgin, Illinois, P. S. Bartlett, assisted by George Hunter, and J. M. N. Fredrick. The watches are put in operation, under the supervision of the above maned gentlemen, assisted by five young lady employees of the factory.

Blood's patent adjustable car seat, for use on railroad cars or coaches—exhibited by Mr. John H. Blood, of this city.

J. Ward, of Knoxville, Iowa, exhibits a printing press, styled "Attachment patented to the Gordon Liberty and other presses." He claims that he can print any number of colors at one impression.

F. P. Corby & Co., manufacturers and dealers in railway equipments of this city, have on exhibition a large and varied assortment of railway machinery.

Broom manufacturing machines, four in number, sugar mills, four in number, and a portable grain mill, are on exhibition.

John Goodin, of St. Louis, Nos. 424 and 426 North Third street, exhibits a Marriott patent machine for heating buildings by the use of hot water.

A. T. Hafford, of St. Louis, exhibits the "Telescope Force Pump," of which he is the manufacturer.

The Triumphant Gas machine," manufactured by Siegel & Bobb, under Horace Holton's patent. It is claimed for this machine to be useful not only as a portable but also a stationary apparatus.

George S. Goble of this city, exhibits the "Hydraulic Jack Press," Joseph Ryan patentee and manufacturer.

H. H. Alms, of Kansas City, Mo., exhibits a tobacco packing machine, for pressing fine cut or any other tobacco.

Richard Garstang, of St. Louis, has on exhibition a model of a portable engine. The peculiarity of this engine is claimed to be that the cylinder is inside of the dome, and that no pipe is used except the chimney pipe, thus saving expense as well as a complication of machinery.

Babcock's self-acting steam fire engine, manufactured in Chicago, New York and Boston, presents a fine appearance. It is on exhibition by Q. Q. Stodder, of No. 302 North Fourth street.

Joseph Mesler of this city, exhibits a model of a sectional boiler, W. S. Savage, manufacturer, of Knoxville, Tenn.

W. A. Plantz, of Iowa Falls, Iowa, exhibits a barrel car or carriage, for the transportation of beer and other barrels.

Wm. S. Wilcox, of South St. Louis, exhibits Leonard "Finley's Balancing Pistons," manufactured at the Iron Mountain railroad shops, at Carondelet.

Next come Hite's improved paddle-wheel model, patented August 29, 1871; also adjustable gang-saw, exhibited by J. H. Bennett, of Hannibal, Mo.

Wheeler J. Vaughan of Montrose, Henry county, Mo., presents a model of a shingle and barrel-heading machine. Brown & Sterry, of Norwich, Conn., Boardman's patent combination wrench for machinists and others, several sizes.

There is a fine display of pumps on the southwest corner of the grounds, in the buildings of L. M. Rumsey & Co., who exhibit 100 varieties of pumps of every description, including force, suction, propelling and distributing. This firm have erected a building of their own, and have on exhibition a large number of pumps, yet those exhibited do not include their supply. They claim to have at least 200 varieties.

Railroad signals and draws are well represented by Toby's drawbridge signal and lock, manufactured by the St. Louis Railway Supply company. The one on exhibition is already ordered for the Chicago and Alton railroad.

AWARDS IN CLASS B.

Steam Fire Engine.—1st. prem., dpl. and $25, C. Ahrens & Co., of Cincinnati; exhibited by St. Louis Fire Department.

Hand Fire Engine.—1st. prem., dpl., L. M. Rumsey & Co., St. Louis.

Combined Governer Valve.—1st. prem., dpl., J. Augustus Linch & Co., Boston; exhibited by Smith Beggs & Co., St. Louis; 2nd. prem., medal, Jno. Goodin, St. Louis.

Model Steam Engine.—1st. prem., dpl., Smith, Beggs & Co., St. Louis; honorable mention to Richard Garstang, St. Louis.

Railroad Crossing.—1st. prem. dpl., St. Louis Railway Supply Manufacturing Company.

Packing for Steam Cylinders.—1st. prem., dpl., Leonard Finley, Carondelet, Missouri.

Steam Gauge.—1st. prem., dpl., St. Louis Manufacturing Co.; 2nd. prem., medal, L. M. Rumsey & Co., St. Louis.

Car Coupling.—1st. prem., D. L. McComass, Calhoun, Mo.

Iron Drill Press.—1st. prem., dpl., H. Bates & Son, Dayton, Ohio; exhibited by W. H. McClelland; 2nd. prem., medal, Warren & Waterman, St. Louis.

Steam Pump.—1st. prem., dpl., Jno. Kupferle, St. Louis; 2nd. prem. medal, Chas. B. Hardick, Brooklyn, New York; exhibited by Warner & Abel, St. Louis.

Portable Force Pump.—1st. prem., dpl., Abiel T. Hafford, St. Louis; 2nd. prem., medal, Barnum, Kennett & Co., St. Louis; honorable mention to L. M. Rumsey & Co.

Pump for Wells.— 1st. prem., dpl., L. M. Rumsey & Co., St. Louis.

Pump for Cisterns.—1st. prem., dpl., L M. Rumsey & Co., St. Louis.

Tenoning Machine.—1st. prem., dpl., Silver & Denning, New York; 2nd. prem., medal, T. S. Rook, York, Ill.

Shingle Machine.—1st. prem., dpl., C. & S. Burt, Dunleith, Ill.; 2nd. prem., medal, H. P. Randle, Paducah, Ky.

Moulding Machine.—1st. prem., dpl., Frederick Baldwin, Jaynesville, Wis.; by Alex. G. Donelly, St. Louis.

Scroll Saw Machine.—1st. prem., dpl., C. Amsler, St. Louis.

Flour Packing Machine.—1st. prem., dpl., Barnard & Leas, Moline., Ill.; exhibited by G. & W. Todd & Co., St. Louis.

Portable Flouring Mill.—1st. prem. dpl., G. & W. Todd & Co., St. Louis.

Corn and Cob Mill.—1st. prem., dpl., Barnum, Kennett & Co., St. Louis; 2nd. prem., medal, J. C. Burrass, Carrollton, Illinois.

Portable Grain Mill.—1st. prem., dpl., G. & W. Todd & Co., St. Louis; 2nd. prem., medal, Geo. L. Squires & Bro., Buffalo, New York.

Bran Duster.—1st. prem., dpl., Jas. Richmond, Lockport, New York.; exhibited by G. & W. Todd & Co., St. Louis.

Smut Machine.—1st. prem., dpl., Homer, Babcock & Co., Silver Creek, N. Y.; exhibited by G. & W. Todd & Co., St. Louis.

Grain Separator.—1st. prem., dpl., Turner Parks & Co., Cuyahago Falls, Ohio; 2nd. prem., medal, Barnard & Leas, Moline, Ill.

Grain and Meal Dryer.—1st. prem. dpl., G. O. Hoffman, Beardstown, Ill.

Grain Weigher.—1st. prem., dpl., J. J. Brown, Davenport, Iowa.

Millstones.—1st. prem., dpl., G. & W. Todd & Co., St. Louis.

Belting Cloth.—1st. prem., dpl., Dufane & Co., Switzerland; exhibited by G. & W. Todd & Co., St. Louis.

Smut Machine and Separator.—1st. prem., dpl., Valentine Weismantel, Belleville, Ill.; 2nd. prem., medal, Jas. Richmond, Lockport, N. Y.

Ware House Receiving Separator.—1st. prem., dpl., Barnard & Leas, Moline, Ill.; exhibited by G. & W. Todd & Co., St. Louis.

Hoisting Machine, (Hand).—1st. prem., dpl., C. H. Garrigues, St. Louis; 2nd. prem., medal, Missouri Hoisting Company, St. Louis.

Hemp Brake Machine.—1st. prem., dpl. and $50, Wm. Jones, St. Louis.

Card Printing Press.—1st. prem., dpl., J. E. Priest; exhibited by Woodward & Tiernan, St. Louis.

Sugar Mill.—1st. prem., dpl., George L. Squire & Bro., Buffalo, N. Y.; 2nd. prem., medal., Blymyer, Norton & Co., St. Louis; exhibited by Barnum, Kennet & Co.

Leather Belting.—1st. prem., dpl., G. & W. Todd & Co., St. Louis.

Lace Leather.—1st. prem., dpl., Wm. Caupe & Co., Attleboro, Mass.; exhibited by G. & W. Todd & Co., St. Louis.

Belting Leather, (Whole Hides). 1st. prem., dpl., G. and W. Todd &. Co.

Rubber Belting and Packing.—1st. prem. and dpl., Belting and Packing Co., New York.

Rubber Hose.—1st. prem., and dpl., New York Belting and Packing Co.

Rubber Suction Hose.—1st. prem., dpl., New York Belting and Packing Co.

Best Specimen Apprentices Workmanship.—Frank Graham, an apprentice at the Fulton Iron Works, for a well executed wheel pattern, dpl. and $25.

The following articles received "Honorable Mention" or Diploma from the Awarding Committee in this department.

Fire Regulator.—D. Harger, Des Moines, Iowa.

Barge and Mine Pump.—Mississippi Valley Manufacturing Co., St. Louis.

Stone Dresser.—Rice & Anderson, Quincy, Ill.

Turbine Water Wheel.—Stilwell, Brice & Co., Dayton, Ohio.

Wooden Try Staff, Mill Picks and Mill Curb.—G. & W. Todd & Co., St. Louis.

Railroad Wrecking Frog.—Dpl., S. M. Hudson, St. Louis.

Diamond Pointed Rock Drill.—Dpl., American Diamond Drill Co., New York.

Combined Shear Punch and Bender.—Dpl., Jno. J. Sandgria, Cincinnati, Ohio.

Velocimeter.—Honorable mention, Edward A. Lewis, St. Charles, Mo.

Tire Shrinker.—Honorable mention, Pratt & Fox, Manufacturing Co., St. Louis.

Self-Operating Jack Attachment.—Dpl., Enos, Bowen & Co., Chicago, Illinois.

Tackle Blocks.—Honorable mention, Westlake & Button, St. Louis.

Vertical Engine and Boiler Combined.—Honorable mention, Colt's Patent Fire Arms Manufacturing Co., New York.

Scroll Saw.—Honorable mention, Owens, Lane & Dyer, St. Louis.

Set Machinist's Tools.—Honorable mention, W. Ketchel, St. Louis.

Heater and Filter Combined.—Honorable mention, Stilwell, Brice & Co.; by Smith, Beggs & Co., St. Louis.

Hydraulic Jacks and Presses.—Honorable mention, Joseph Ryan, St. Louis.

Mill Spring.—Honorable mention, Jno. A. Hafner, Santa Fe, Ill.

Routing Machine.—Honorable mention, J. L. Haven & Co., Cincinnati, Ohio.

Rotary Engine.—Honorable mention, G. B. Massey, New York city.

Railway Switch Stand and Signal.—Dpl., St. Louis Railway Supply Manufacturing Co.

Railway Lantern.—Honorable mention, St. Louis Railway Supply Manufacturing Co.

Wrought Iron Railway Draw Bar.—Honorable mention, St. Louis Railway Supply Manufacturing Co.

Hemp Packing.—Honorable mention, St. Louis Railway Supply Manufacturing Company.

Draw Bridge Signal and Lock.—Honorable mention, St. Louis Railway Supply Manufacturing Co.

Liquid Fuel Machine.—Dpl., Whipple & Dickerson, New York.

Wood Boxing and Iron Drilling Machine.—Dpl., McIlvain & Cuff, Petersburg, Ill.

Machinist's Vise.—Honorable mention, Isaac Fisher, St. Louis.

Railroad Car Refrigerator.—Honorable mention, Western Refrigerator Car Co., St. Louis.

Eureka Compound Boiler.—Joseph Ryan, St. Louis.

Watchmaking, Tools and Machinery.—Dpl., National Watchmaking Co., Elgin, Illinois.

Watch Movements.—Large bronze medal, National Watchmaking Co., Elgin, Illinois.

Loom.—Dpl., George Crompton, Worcester, Mass.; by E. Bowen & Co., Chicago.

Well Points for Drive Wells.—Honorable mention, L. M. Rumsey & Co., St. Louis.

Display of Pumps.—Honorable mention, L. M. Rumsey & Co., St. Louis.

Model Shingle and Heading Machine.—Honorable mention, Wheeler & Vaughn, Montrose, Mo.

Circular Saw Guide.—Honorable mention, A. Middlebrook, Glasgow, Mo.

Smoking Tobacco Press.—Honorable mention, H. H. Ahns, Kansas City, Mo.

Patent Combination Wrench.—Dpl., Brown & Stern, Norwich, Conn.

Babcock Fire Extinguisher.—Dpl. Northwestern Fire Extinguishing Co., St. Louis.

Machine to upset Cold Tires.—Dpl., Mawry Axle Machine Co., Norwich, Conn.

CLASS C.

MECHANICAL DEPARTMENT.

E. A. MANNEY, SUPERINTENDENT.

The continued and rapid growth of this department of the St. Louis Fair, exhibits in miniature the progress of mechanical industries throughout the West. The persistent and well directed efforts of the Superintendent, to have this department second to no other portion of the great Fair, have been entirely successful; and the thousands upon thousands who throng the spacious edifice through all the days of the exhibition, show conclusively how strong a hold it has upon the public sympathy. Like every other portion of the Fair, it began in extreme feebleness, and has grown steadily up, from one degree of strength and beauty to another, until now it is difficult to furnish suitable accommodation to the exhibitors who have articles to enter in this Class. Two years ago a spacious edifice was erected, and named "Mechanical Hall," but in two years time it has become quite too small for the purpose intended. With every foot of space in the building occupied, a temporary structure placed on one side of the main building, and many articles that could bear exposure to the weather, arranged on the open ground, many applicants for space had to be denied, because there was no suitable accommodation for them. The applications for space exceeded a thousand in number, and the individual articles on exhibition amounted to tens of thousands. The same remark would apply to other portions of the Fair, but not to the same extent as in this case. The intelligent visitor wonders, when he sees articles exhibited in classes that are quite incongruous to them in nature, form or character. This apparent inconsistency arises from the fact, that some departments were more overcrowded than others, and the President and Secretary, in their desire to accommodate all comers, were obliged to force some articles into strange and unnatural companionship. Let us hope that another year may increase the accommodations, so that there shall be room for all.

It should be understood that this department does not exhibit machinery, but rather the ten thousand things produced by machinery. Its immense collection of things rare, useful and beautiful, shows us what wonderful transformations are wrought by the inventive brain of genius and the cunning hand of ingenuity. It is a wonderful museum of the arts, and demonstrates the vast superiority of modern, over ancient accomplishment, in this line of human enter-

prise. Especially does it show how the useful predominates over the merely beautiful, in the field of modern invention. Walking through the aisles of this great palace of industry, the eye is charmed with a thousand objects, marvelous for their artistic beauty, or the wonderful skill and power that have adapted them to the purposes of life. In iron, you shall find everything: from a lady's hair-pin to a tilt-hammer, weighing ten tons—from a cambric needle to a lightning rod, and from a steel bodkin to a hundred pound columbiad:—in wood you shall find such beautiful workmanship in mahogany, rosewood, maple, American and French walnut, and other varieties, as shall make you wonder by what magic the transformation has been wrought. The whole world has contributed to this grand exposition; and every turn you take, new charms and beauties flash upon your vision. Here are diamonds from Brazil or Golconda, a few of them set in Australian gold to form a bridal set of jewelry, worth $10,000. The same bride may get a beautiful ostrich plume from Africa, and a Persian shawl worth $3,000; she may select her English or French style of carpets that will cost a thousand dollars to a room; have curtains that will adorn her parlor at $500 the window; and a set of furniture for her chamber for $5,000. And then she may complete her house furnishing with mirrors, chairs, sofas and the hundred other articles of use or beauty at a sum, anywhere from five to fifty thousand dollars.

But, though this exhibition hall is like a palace of Aladin, dazzling in its rare and marvelous beauties, containing displays of fabulous richness and cost, yet its highest attraction lies in the fact, that almost every display shows the predominance of the useful over the merely beautiful.

The Mechanical Hall is a place where we learn what strides St. Louis is making in the department of mechanical industry. At the inauguration of the Fair, sixteen years ago, there were very few specimens of home manufacture in this building—or rather in the big wooden shanty that preceded it—now there are thousands of articles in the various branches of mechanical skill, that challenge the admiration of spectators, and demonstrate the fact that we need not be dependent upon others for such articles as are best suited to supply the wants of civilized life.

This building too is the best possible place to educate the public taste. Look at the multitudes who swarm through its aisles every day of the Fair. With many it is nothing but a rare combination of ten thousand different things; but the majority look to learn. Neither man, woman nor child can pass through this exhibition with the eyes open and the mind awake, and not learn some useful lesson.

All the improvements made by modern ingenuity in matters pertaining to domestic comfort, are clustered together here for easy inspection, and "he that runs may read."

PRINCIPAL EXHIBITORS AND ARTICLES EXHIBITED IN CLASS C.

In the 60x36 addition just east of the main hall, can be found two safes, one vault and safe-locks on exhibition by McNeal & Urban of Ohio; a monitor furnace by Mr. Jno. Goodin of this city; a fine lot of solid steel hammers from Baldwin and Levezey of the Philadelphia steel works; eleven fine stoves from the Western Stove Manufacturing Company; two of Steiner's gas machines, and a fine model of the same; one M. & E. C Curtis & Co's gas burning stoves; a fine lot of school-furniture from A. S. Barnes & Co., of Chicago; a splendid housewarming apparatus—the "Metropolis" from R. S. Koll & Co., Pittsburg, Pa; R. B. Lord & Co., of the United States Elastic Spring Bed company have a good display there; F. W. Hafmeyer, one of their bakers and roasters; Wenkler & Meyer a good display of children's carriages; John Goodin has a large display of stone and blacksmith tools; O. M. Martin & Son have a perfect gem of a milk and provision safe; the South-Western Publishing company of this city have a fine display of globes, maps and a general school outfit; Barsaloux's improved barrel heads were quite attractive; there was found an excellent thing known as Evan's railroad safety stove, intended to become a "self fire squelcher" in case of a railroad accident. Some fine willow baskets were also there.

Judy & Co. have there the union egg carrier, and a novel folding coop. Then comes R. Scrimshaw, of New York, with his underground gas machine, and a fine specimen of floor and sidewalk tiles; also W. P. Nelson's box sash window ventilator.

As you enter the main building of the Mechanical Department from the west, the first attraction is the profuse and excellent display of work from the St. Louis Railway Supplies Manufacturing company, with about forty-two feet of space filled full. Immediately upon the right is the seventy by twenty feet space, filled with samples from the well-known firm of Pratt & Fox, manufacturing company. It abounds in much of interest to manufacturers and dealers.

At the left of this is a gem of work of a hard working man, one of the Lange Bros. It is a beautiful showcase, containing walnut, mahogany, maple and other inlaid work, and it required one year's work to bring it to its present perfection.

Emmons and Campbell have a fine display of wire goods.

L. A. Watkins the same of leather display and harness oil.

G. F. Chamberlin, blank book manufacturer, has a fine display of goods in his line.

F. Schefferle has a good display of preserving kettles, frying pans, &c.

Holmes, Babson & Co. have an attraction in the line of refrigerators, and a nice basket of the same style for picnics, &c.

Near the rotunda is the largest display of some fine goods. S. H. Burrell has a fine furniture display. One set of three pieces has no less than thirteen different kinds of wood inlaid, and a beautiful black ebony writing desk among the other goods.

Lewis and Groshon have a beautiful display here also, of hats, caps, furs and masonic goods.

Jacob Blattner has a fine exhibit of optical and achromatic instruments, barometers, compasses, &c.

In the furniture line again comes Sanford G. Scarritt, with a beautiful black ebony set.

Vane, Calvert & Co., make a good dislay of prepared paint goods.

F. G. Comstock & Co., make a specialty in a gem of a sofa and bed combined.

Jno. H. Keyser & Co., with their furnaces, ranges and heaters, thirty in all

make a fine display. Furnaces seem to be their specialty.

Hackett, Anderson & Forman, with their enameled grates, and Hackett's patent grate and improved Franklin stove was also an attraction.

John Fallon's fine display of traveling trunks, satchels, valises and ladies' trunks, in the south wing, was good.

Bard & McRobbie have also there a novelty and a good thing in the line of an easy chair and bed combined. It is Wilson's patent, and readily adjusted.

Next to them comes J. P. Gallagher with his patent self-closing and never-freezing hydrant. It looks like a good thing.

F. Mueller & Son make an excellent specialty on moss, hair and shuck-mattresses.

Kennard & Sons make a specialty on carpeting and window curtains, and are located also near the center of the hall. Their exhibit is attractive and excellent.

Blanchard & Garrison of the Missouri foundry, have a large and excellent show of furnaces, ranges, &c., near the center of the hall.

H. C. Benning makes a good display of glass, queensware, lamps, &c.

Charles Schleiffarth has an attractive feature in the center of the hall in the line of trusses, supporters, shoulder-braces, orthopedic instruments, &c., chiefly of his own admirable handiwork.

Couch & Hull make a specialty on Couch's adjustable pillow and bolster.

In the center of Mechanical Hall is the octagon pavilion, erected by F. W. Rosenthal & Co., devoted to fresco decorations in paper and cloth, and curtain goods. They make a specialty in their line on American goods.

D. C. Jaccard & Co., have about $25,000 worth of goods on exhibition in the centre of the hall, and a decided treat in its line. It consists of solid silver and plated ware, jewelry, &c. One bridal set is valued at $5,000. A $300 clock, Egyptian, among the last goods out of Paris before the war. Their display is very attractive.

Saml. Cupples, the importer, has fifty-six feet long of a display in the west wing, including pine ware, fruit boxes, wrapping paper, wire goods, brushes, silver-plated ware, table cutlery, cedar ware, and—well, we cannot tell half in our brief space—but it is an excellent display.

Whitman, in the glass and queensware, located in the centre of the west wing, has 150 different styles of coal-oil lamps. Aside from their novelty lantern, they make a specialty in their display of brackets, table glassware, &c.

B. R. Lippencott make their special display in soda fountains and attachments. They have there two generators, four fountains, six soda water apperatus, &c.

A. M. Leslie & Co., have an excellent display of dental and surgical instruments, and batteries.

The St. Louis stamping company, in the west wing and north side, have a fine display.

Jno. Baumann, jr., has a number of fine drug and warehouse scales on exhibition.

Moorman & Co., make a fine display of marbleized grates and mantels, and also marbleized iron mantels.

Thomas long makes a specialty in the display of ranges, mantels and grates. Very fine.

R. B. Pearce & Co., have a magnificent display of hats, caps, muffs, &c.

Scruggs, Vandervoort & Barney, in their thirty feet glass palace near the center of the hall, have a great attraction in the dry goods line. There are shawls ranging from $2,000 down to common $6 ones. Ladies eyes dilated as they gazed, and pater-familias and darling husbands did not care to waste time in looking thereat. Their display of goods was among the best in the department.

Mr. A. S. Aloe has a fine display of compasses, optical and mathematical instruments, thermometers, &c.

The Mound City boot and shoe store have a fine and admirable display of goods in their line.

J. Van & Simonds have a large line of goods on exhibition, consisting of four hotel and five family ranges, carving table, laundry stoves, water heaters, etc., etc.

The Big Boot store has a general assortment of boots and shoes on exhibi

tion. Their mammoth boot attracted almost as much attention as it did at the Sanitary Fair of 1864, when Miss Nellie Grant figured as the "old woman in the shoe."

N. M. Johnson had three pairs of boots on exhibition, and they were admirable. The handiwork on the boot legs represented the three nationalities, Irish, German and American. The needle work thereon was done by hand, and occupied about one year of time.

C. J. Aber made a specialty of ladies' shoes, and they were unsurpassed in the line of French goods. We noticed one pair where the sole and heel were all of one piece.

Reiss, Bergman & Co., of Belleville, Ills., made a good display of split, wood and cane-seated chairs.

Cheever, Burchard & Co., in the line of house furnishing goods and hardware cutlery in the center of the hall, occupying twenty-six feet of room, had an elegant display.

A. Prismeyer & Co., had a fine display of ladies' shoes—and in the same line we will not fail to mention the admirable work of Wm. Haslem.

R. Beauvais' fine display of guns, rifles, fishing tackle, &c., was quite attractive.

John Matthews of New York, had on exhibition his Excelsior Generator and bottling apparatus, as also an apparatus for filling and corking soda bottles.

A. F. Shapleigh & Co., had a mammoth display of edge tools and hardware. They occupy 20x36 feet, and the display was very creditable.

The Mississippi iron works—Messrs. T. R. Pullis & Co., had a fine display of grates, mammoth vases, iron chairs, &c.

Messrs. Holthaus & Bro., had a fine display of show cases.

Messrs. Gage & Horton had a fine display of coal and wood cooking-stoves, four or five sizes; the wood stove having an improved fire-box.

Diebold & Kienzle had a good display of bank locks in the south wing.

J. H. Lewis & Co., had an admirable bed and lounge combined on exhibition.

Henry Tellemer had an excellent display of leathers and shoe-findings.

J. H. Crane, near the center of the hall, had a fine display of black walnut furniture, occupying about twenty-seven feet of space. His self fanning chair and rocker was an attraction.

Brolaski & Co., made a specialty on ladies' shoes, and his McKay machine for sewing boots and shoes, in operation during the day, was a source of considerable attraction.

H. M. Thompson & Co., have a large and excellent display of useful and ornamental pottery.

Lewis & Groshon's display of ladies' fancy furs was highly creditable; also a specialty on silk hats.

R. Whelan has an excellent patent star bridle bit on exhibition.

J. E. McDonough & Co., make an excellent specialty in the center of the hall on sofa chairs, parlor sets, lounges, spring beds and matresses.

Seigel & Bobb make a specialty in their usual line of goods, gas and coal oil fixtures.

Winkler & Meyer have a good display of willow ware and children's carriages.

Van Blarcom & Felch have a beautiful display of fine harness near the center of the hall.

Hackett, Anderson & Forman make a specialty not only of their fine enameled goods, but of Hackett's patent grate.

Monroe's patent spring bed—H. Z. Schell, agent, attracted considerable attention.

VEHICLES.

The display of vehicles is made on the east side of the old amphitheatre. There we found Pennoyer & Co., of Chicago, with one sulky on exhibition; Jas. A. Wright, of this city, with one skeleton wagon, one skeleton sulky, one barouche and one buggy.

Henry Tompkin has two top buggies one rockaway and one doctors' carriage, one family carriage and one beautiful peddlers' wagon.

Mr. A. Wight has one business wagon, one street car, the first three feet or narrow gauge street railway car built, and one omnibus.

Taylor, Day & Co., of Fredonia, New

York, have a neat light road wagon on exhibition.

Wesley Fallon has three top buggies, one single-seat buggy; also for the Chicago Novelty works, one sulky, and also a skeleton, same.

Theo. Salorge has two 2-horse buggies on exhibition.

Messrs. Woodburn & Sarven, of the Sarven Wheel company, have a large and excellent display of goods in their line, at the same place.

Warren, Waterman & Co.'s display of carriage hardware is very good.

On the outside of the Mechanical Hall, there was much of attractive interest. Messrs. Buck & Wright have about fifty stoves on exhibition. At their fine pagoda were two cooking stoves—coal and wood—in successful operation, cooking bread and cakes for their visitors. It is a treat to visit their cozy place.

The Excelsior Manufacturing company have a splendid pagoda erected, in which two stoves—wood and coal—of the celebrated Charter Oak pattern, were in full blast, cooking for the dear people, using up about 1,000 pounds of flour a day. They have about 115 stoves on exhibition. One of Woodward & Tiernan's card presses, a new St. Louis patent, is busy printing in the pagoda. This place attracted a crowd all day.

Toby's draw bridge signal was an outdoor attraction in this Class. It gives a signal 500 feet from a draw bridge, where attached, and it is impossible for it to make a mistake.

Boyd's house ventilator; Wright's self-adjusting ladder; F. J. Comstock's step ladder; F. Goesby & Bro.'s patent hinge; Cook's vaporine light; the Laclede fire brick, terra cota and furnace tiles, and Goodin's machinery for heating buildings and hotels by warm water, were among the other attractions.

Among the four thousand entries, it is impossible to do justice to all in this hurried special mention, and those whom we have neglected mentioning must accept this apology.

Among the articles in the new tent addition west of the main building worthy of notice, is Baird's patent buggy wheel, with outside hub of malleable iron. It is a Vincennes (Ind.) production. A. Pries & Co. have a fine display of ornamental store and office furniture. Beckford, Curtis & Deming have fine specimens of pure oak leather belting and hose. They come from Buffalo, New York. S. P. Faulks, of Glasgow, Mo., made a considerable attraction for mothers and children with his admirable baby jumper.

Comstock, Collins & Co., of Quincy, Ill., have on exhibition there a fine display of cooking and heating stoves.

At the main building many other articles are worthy of special notice. One display of native silver near the main entrance was quite attractive It consisted of a 12 1-3 lb. lump of silver ore valued at $195 81, taken from the Rosario mines in New Mexico; and alongside the specimen were two dozen of silver spoons, one dozen knives and one dozen forks, made from silver from the same mines.

R. Beauvais, of the Murdock Fishing club, has a fine display of nets of all kinds, and a beautiful gun and trappings, valued at $400.

A. Turner & Co., with Samuel Cupples, has a fine display of varnished tin ware. David Cromwell of this city has two admirable refrigerators. L. L. Sawyer of Meriden, Conn., have a specialty of curtains in the north wing worthy of attention. Walker, Stiles & Co. of Cincinnati make an excellent specialty on iron measures and buckets, said to be the best in use.

Thomas & Holmes have a large display of ventilators and wrought iron furnaces in their fine forty-five-feet pagoda attached to the main hall. It is the finest display of the kind on the grounds, and they have about $2,000 worth of stock there.

Dotson's combined bed and sofa, an excellent institution, came on from Louisville, Kentucky. It is near the center of the main hall, and attracted considerable attention. Mr. J. H. Green, one of the patentees, represents it, and it is well worthy of attention—more especially as a manufactory of this work is to be established here.

Fred. Dallas has a fine display of white granite and Parian marble goods from the Hamilton Road pottery of Cincinnati, Ohio.

J. W. Goodhue & Co., "around the corner," have a fine display of boots and shoes on exhibition.

A. Turner & Co., of Newark, New Jersey, make a fine display of planished Japanese and plain tin ware.

The St. Louis Railway Supply company, in the west wing of the main building, have a magnificent display of goods in their line, and worthy of careful examination to persons in the trade in that line.

Wm. Allen Ingalls, of Chicago, makes a specialty of patent screws of all descriptions—well worthy of note.

Hendricks & Crittenden have a fine display of books and stationery.

AWARDS IN CLASS C.

Best Arranged and Handsomest Display in this Department.—Fourteen entries under this head; 1st. prem., $100, awarded to F. W. Rosenthal & Co., St. Louis; 2nd. prem., $50, to J. H. Crane, St. Louis; 3rd. prem., $25, Kennard & Sons, St. Louis.

Best Display Philosophical and Mathematical Instruments.—1st prem., dpl. and $20, A. S. Aloe, St. Louis.

Surgical Instruments.—1st. prem., $10, A. M. Leslie & Co., St. Louis.

Optical Instruments.—1st. prem., $10, J. Blattner, St. Louis.

Galvanic Battery.—1st. prem., $5, A. M. Leslie & Co., St. Louis.

Dental Instruments.—1st. prem., $10, A. M. Leslie & Co. St. Louis.

Optical Apparatus.—1st. prem., $10, J. Blattner, St. Louis.

Electro Magnetic Apparatus.—1st. prem., $5, A. M. Leslie & Co., St. Louis.

Thermometers, Best Display.—1st. prem., dpl., A. S. Aloe, St. Louis.

Barometers.—1st. prem., dpl., A. S. Aloe, St. Louis.

Artificial Teeth.—1st. prem., $10, S. S. White, Philadelphia; exhibited by A. M. Leslie, St. Louis.

Artificial Limbs.—1st. prem., dpl., and $20, to L. Lockwood, St. Louis.

Collection of Bandages, Trusses and Orthopedic Instruments.—1st. prem., dpl. and $20, to Charles Schleiffarth, St. Louis.

Collection of Supporters, Bandages and Shoulder Braces for Ladies.—1st. prem., dpl. and $10, Mrs. E. J. Harding, St. Louis.

Theodolites.—1st. prem., $5, A. S. Aloe, St. Louis.

Level.—1st. prem., $5, A. S. Aloe, St. Louis.

Compass for Surveying.—1st. prem. $10, J. Blattner, St. Louis.

Achromatic Telescope.—1st. prem., $5, A. S. Aloe, St. Louis.

Spectacles, (Display).—1st. prem., A. S. Aloe, St. Louis.

Gold and Silver Ware.—1st. prem., dpl. and $50, D. C. Jaccard & Co., St. Louis.

Best Display of Jewelry.—1st. prem., dpl. and $100, D. C. Jaccard & Co., St. Louis.

Best Display Silver Plated Ware.—1st. prem., dpl. and $25, Rodger Smith & Co., Hartford Conn.; exhibited by Saml. Cupples, St. Louis.

Miscellaneous.—Drawing apparatus for forearm and leg, premium, medal, to L. J. Willien, Effingham, Ill.

Car Wheel.—1st. prem., medal, St. Louis Car Wheel Co.

Iron Wire, Various Sizes, Best Display.—1st. prem., $5, Hillman Bro. & Sons, St. Louis.

Copper Wire.—1st. prem., $5, Seller & Co., St. Louis.

Japanned Ware, Best Display.—1st. prem., dpl., St. Louis Stamping Co.

Bar Iron.—1st. prem., medal., Hillman Bro. & Sons.

Wire Work.—1st. prem., $10, Ward Cheerwood & Co., Lowell, Mass.; exhibited by Saml. Cupples.

Bellows.—1st. prem., $10, to J. W. Evenden, St. Louis.

Horse Shoes.—Seven entries; 1st. prem. $5, Jno. Howard, St. Louis.

Horse Nails.—1st. prem., medal, Globe Nail Co., Boston, Mass.

Shovel and Tongs.—1st. prem., $5, Cheever, Burchard & Co. St. Louis.

Bolts.—1st. prem., medal, St. Louis Railway Supply Manufacturing Co.

Boiler and Tank Rivets.—1st. prem., medal, Hillman Bro. & Sons, St. Louis.

Tin Ware.—Four entries; 1st. prem., $10, A. Turner & Co., Newark; exhibited by S. Cupples, St. Louis.

Boiler and Sheet Iron.—1st. prem., medal, Hillman Bro. & Sons, St. Louis.

Tinned Iron Work.—1st. prem., dpl., St. Louis Stamping Co.

Chimney Tops.—1st. prem., $5, Thomas & Holmes, St. Louis.

Ventilator.—1st. prem., $5, Thomas & Holmes, St. Louis.

Stone Cutting Tools.—1st. prem., $5, Jno. Goodin, St. Louis.

Stamped Tin Ware.—1st. prem., $5, St. Louis Stamping company.

Bird Cages, Display.—1st. prem., $5, Cheever Berchard & Co.

Wire Rope.—1st. prem., $5, St. Louis Railway Supply Manufacturing Co.

Brass and Copper Ware, Best Display.—1st. prem., $10, Blanchard & Garrison, St. Louis.

Brass Work, Best Display.—1st. prem., $10, L. M. Rumsey & Co., St. Louis.

Bells for Stock.—1st. prem., medal, A. T. Shapleigh & Co., St. Louis.

Chandeliers.—1st. prem., dpl. and $10, Siegel & Bobb, St. Louis.

Gas Burners.—1st. prem., medal., Siegel & Babb, St. Louis.

Lamps.—1st. prem., $5, H. C., Benning, St. Louis.

Lanterns—1st. prem., medal, St. Louis Railway Supply Manufacturing Co.

Locomotive Headlights.—1st. prem., dpl., St. Louis Railway Supply Manufacturing Co.

Portable Gas Works.—1st. prem., $10, Henry Tirrell, Newark, N. J.

Soda Fountains, (Copper).—1st. prem., $10, Wm. Gee, New York; exhibited by Enno Sander, St. Louis.

Soda Fountain With Syrup Apparatus.—1st. prem., $10, Chas. Lippincott, Philadelphia.

Soda Generator.—1st. prem., medal, Wm. Gee, New York; exhibited by Enno Sander, St. Louis.

Stoves, Best Display.—1st. prem., $30. Buck & Wright, St. Louis.

Stoves for Cooking, (Wood).—1st. prem., dpl. and $10, to Chas. Gage, St. Louis.

Stoves for Cooking, (Coal).—1st. prem., dpl. and $10, Buck & Wright, St. Louis.

Stoves for Hotels.—1st. prem., $10, J. H. Keyler, St. Louis.

Stove for Parlor, (Wood).—1st. prem., dpl. and $10, H. Bakewell & Sons, St. Louis.

Stoves for Parlor, (Coal).—1st. prem., dpl. and $10, Hackett, Anderson & Forman, St. Louis.

Stoves for Laundry Work.—1st. prem., $10, Buck & Wright, St. Louis.

Summer Cooking Stove.—1st. prem., $10, M. & E. C. Curtis & Co., St. Louis.

Best House Warming Apparatus.—1st. prem., $10, to Jno. Goodin, St. Louis.

Best Portable Cooking Range.—1st. prem., $10, J. Van & Simons, St. Louis.

Best Cooking Ranges.—1st. prem., dpl and $10, Hand, Whitehouse & Co., St. Louis.

Best Hotel Cooking Range.—1st. prem., $10, Blanchard & Garrison, St. Louis.

Best Broiler.—1st. prem., medal, Blanchard & Garrison, St. Louis.

Vases.—1st. prem., $15, T. R. Pullis & Bro., St. Louis.

Gates.—1st. prem., dpl. and $10, Jno. Stupp, St. Louis.

Settees.—1st. prem. medal, T. R. Pullis & Brother, St. Louis.

Mantels, Enameled.—1st. prem., $10, Hackett, Anderson & Forman, St. Louis.

Grates.—1st. prem., medal, Hackett, Anderson & Forman, St. Louis.

Grates, Enameled.—1st. prem., $10, Hackett, Anderson & Forman, St. Louis.

Railings.—1st. prem., $10, Jno. Stupp.

Malleable and Gray Iron Castings.—1st. prem., $20, Pratt & Fox Manufacturing Co., St. Louis.

Monuments.—1st. prem., $10, Andrew Dodds, St. Louis.

Ornamental Fountain.—1st. prem., dpl. and $20 to T. R. Pullis & Bro.

Hydrant and Stop Cock.—1st. prem., dpl., J. P. Gallagher, St. Louis.

Mechanical Advertiser.—1st. prem., medal, Thos. J. Meek, St. Louis.

Galvanized Iron Work.—1st. prem., medal, Hull & Cozens, St. Louis.

Iron Mantels, Marbleized.—1st. prem., medal, Hackett, Anderson & Forman, St. Louis.

Soldering Machine.—1st. prem., medal, B. Williams, Jefferson, Texas.

Sauce Pan.—1st. prem., medal, to F. Schifferle, St. Louis.

Jack Screws.—1st. prem., medal, Julius Morrissee.

Acid Distributor.—1st. prem., medal, Wm. Gee, New York; through Enno Sander, St. Louis.

Slate Roofer's Tools.—1st. prem., medal, Mathias Krist, St. Louis.

Display of Steel Tools.—1st. prem., medal, to Jno. Goodin, St. Louis.

Bottling Machine.—1st. prem., medal, Jno. Matthews, New York.

Tumbler Washer.—1st. prem., medal, Jno. Matthews, New York.

Syphon Fitting Machine.—1st. prem., medal, John Matthews, New York.

Coffee Urn.—1st. prem., medal., J. Van & Simonds, St. Louis.

Bureau.—1st. prem., $10, J. H. Crane, St. Louis.

Sofa.—1st. prem., $10, S. H. Burrell, St. Louis.

Office Chairs.—1st. prem., $5, Dotson & Co., Louisville, Ky.

Furniture, Set for Parlor.—1st. prem., dpl., and $50, S. H. Burrell, St. Louis.

Furniture Set for Bed Room.—1st. prem., dpl., $20, J. H. Crane, St. Louis.

Hat Rack.—1st prem., $10, J. H. Crane. St. Louis.

Writing Desk or Secretary.—1st. prem., dpl. and $10, J. H. Crane. St. Louis.

Collection of Cabinet Furniture.—1st. prem., $25, J. H. Crane, St. Louis.

Carving in Wood.—1st. prem., $10, J. H. Crane, St. Louis.

Side Board.—1st. prem., $10, J. H. Crane, St. Louis.

Refrigerator.—1st. prem., $5, J. B. Webster, St. Louis; 2nd. prem., medal, David Cromwell, St. Louis.

School Furniture.—1st. prem., $10, Walker & Burgess, St. Louis.

Weather Strips.—1st. prem., medal, Newcomb Bros.

Upholstery Work.—1st. prem., dpl., $10, J. H. Lewis & Co., St. Louis; 2nd. prem., medal, Geo. Couch, St. Louis.

Mattresses, (Curled Hair).—1st. prem. $5, S. H. Burrel, St. Louis.

Mattress, (Moss).—1st. prem., medal. T. Miller & Sons, St. Louis.

Mattress, (Shuck).—1st. prem., medal. T. Miller & Sons, St. Louis.

Mattress, (Spring).—1st. prem., medal, T. Miller & Sons, St. Louis.

Bale of Moss.—1st. prem., medal, Jno. Oesterly, St. Louis.

Bale of Curled Hair.—1st. prem., medal. Baeder, Adamson & Co., Cincinnati, Ohio.

Window Curtains and Trimmings.—1st. prem., dpl. and $20, F. W. Rosenthal & Co., St., Louis; 2nd. prem., medal, J. Kennard & Sons, St. Louis.

Spring Bed Bottom.—1st. prem., Sq. Woven Wire Mattress Co., Hartford Conn.; exhibited by Emmons & Campfield, St. Louis.

Carpets, Display.—1st. prem., dpl. and $20, J. Kennard & Sons, St. Louis.

Wall Paper and Borders.—1st. prem. dpl. and $20, F. W. Rosenthal & Co. St. Louis.

Butt Hinges.—1st. prem., medal, Barker, Phil., by J. Morrisse, St. Louis.

Window Springs.—1st. prem., medal. W. K. Patrick, St. Louis.

Display of Carpenter's Tools.—1st prem., $20, A. F. Shapleigh & Co., St Louis.

Gate Hinges and Fastenings.—1st. prem., medal, Pratt & Fox Manufacturing Co., St. Louis.

Window Sash.—1st. prem., medal, W. P. Nelson.

Show Cases.—1st. prem., dpl. and $20. Lange & Bro., St. Louis; 2nd. prem., medal, Halthaus & Bro., St. Louis.

Step Ladders.—1st. prem., medal, C. G. Udell, St. Louis.

Window Sash Lock.—1st. prem., medal. Newcomb Bros., St. Louis.

Fancy Scroll Sawing.—1st. prem., medal, Gustav Neumann, St. Louis.

Baby Jumper.—1st. prem. medal, J. P. Faulks, St. Louis.

Self Operating Swing.—1st. prem., medal, Anthony & Congdon, St. Louis.

Milk and Provision Safe.—1st. prem., medal, O. M. Martin, Ann Arbor, Mich.

Two Horse Carriages.—1st. prem., dpl., $50, Theo. Salorgne, St. Louis; 2nd. prem., medal, Bergsterman, Weise & Co., St. Louis.

Phæton.—1st. prem., dpl. and $20, Nathan Card, St. Louis.

Barouche.—1st. prem., dpl. and $20, Bergsterman, Weise & Co., St. Louis.

Top Buggy.—1st. prem., dpl. and $20, Wesley Fallon, St. Louis.

Open Buggy.—1st. prem., $20, Wesley Fallon, St. Louis.

Cabriolet.—1st. prem., $10, Nathan Card, St. Louis.

Sulky.—1st. prem., $10, Thos. M. Brown, Chicago, Illinois.

Peddlers' Wagon.—1st. prem., $10, Henry Timken, St. Louis.

Omnibus.—1st. prem., dpl. and $10, A. Wight, St. Louis.

Business Wagon.—1st. prem., $10, A. Wight, St. Louis.

Street Railway Car.—1st. prem., dpl. and $20, A. Wight, St. Louis.

Buggy Wheel.—1st. prem., dpl. and $10, Woodburn Sarven Wheel Co., St. Louis; 2nd. prem., medal, J. R. Beard, Vincennes, Ind.

Buggy Spokes.—1st. prem., medal, Woodburn Sarven Wheel Co., St. Louis.

Buggy Spring Coupling.—1st. prem., medal, Ætna Axle and Spring Co., Bridgeport, Conn.

Buggy Hubs.—1st. prem., medal, Woodburn Sarven Wheel Co., St. Louis.

Buggy Felloes.—1st. prem., medal Woodburn Sarven Wheel Co., St. Louis.

Express Wagon Wheel.—1st. prem., medal, Woodburn Sarven Wheel Co., St. Louis.

Extension Fire Ladder.—1st. prem., dpl., Francis Guerdan, St. Louis, through Jacob Conrad, St. Louis.

Skeleton Wagon.—1st. prem., medal, Jas. A. Wright, St. Louis.

Dumping Wagon.—1st. prem., medal, McCaleb & Wright, Louisville, Ky.

Barrels for Pork.—1st prem., dpl. and $10, St. Louis Barrel Works.

Barrel for Liquids.—1st. prem., dpl. and $10, St. Louis Barrel Works.

Willow Ware, (St. Louis Manufacture, Best Display.)—1st. prem., dpl. and $20, Cheever Buehard & Co.

Measures for Grain.—1st. prem., medal, Walker, Stites & Co., Cincinnati.

Cedar or Cypress Ware, (Best Display).—1st. prem., dpl. and $20, Saml. Cupples, St. Louis.

Oak Ware.—1st. prem., medal, Saml. Cupples, St. Louis.

Pine Ware.—1st. prem., medal, Saml Cupples, St. Louis.

Axe Handles.—1st. prem., medal, Woodburn Sarven Wheel Co., St. Louis.

Fruit Boxes.—1st. prem., medal, Saml. Cupples, St. Louis.

Head Linings.—1st. prem., medal, J. M. Patterson, St. Louis.

Barrel Heads.—1st. prem., medal, J. B. Barsaloux, St. Louis.

Gent's Dress Summer Boots.—1st. prem., dpl. and $10, C. Hoefele, St. Louis.

Gent's Dress Winter Boots.—1st. prem., dpl. and $10, C. Hoefele, St. Louis.

Gent's Dress Shoes, (Winter).—1st. prem., $5, C. Hoefele, St. Louis.

Gaiters for Ladies, (Summer.)—1st. prem., dpl. and $10, to C. J. Aber, St. Louis.

Gaiters for Ladies, (Winter).—1st. prem., dpl. and $10, C. J. Aber, St. Louis.

Best Assortment of Boots and Shoes, Sewed.—1st. prem., dpl. and $25, J. W. Goodhue & Co., St. Louis.

Best Assortment, do Pegged.—1st. prem., dpl. and $25, J. W. Goodhue & Co., St. Louis.

Traveling Trunk.—1st. prem., dpl. and $10, Jno. Fallon, St. Louis.

Ladies' Traveling Trunk.—1st. prem., dpl. and $10, Jno. Fallon, St. Louis.

Feather Duster.—1st. prem., medal, J. Andrade & Co., New York; by Saml. Cupples, St. Louis.

Shoe and Boot Uppers.—1st. prem., dpl., H. J. Teltermer, St. Louis.

Ventilating Waterproof Boots and Shoes. 1st. prem., medal, Appleton, Noyes and Co., St. Louis.

Saddles and Bridles, (Display).—1st. prem., $10, P. J. Peters, St. Louis.

Saddles, (Gents').—1st. prem., dpl. and $10, P. J. Peters, St. Louis.

Saddles, (Ladies').—1st. prem., $10, P. J. Peters, St. Louis.

Single Harness for Buggy.—1st prem., and $10, Vanblarcomam & Felch, St. Louis.

Collars, pair for Coach Horses.—1st. prem., dpl. and $5, L. Deming, St. Louis.

Saddletrees, American or English.—1st. prem., $5, Bragg & McRoberts, St. Louis.

Hair Girths.—1st. prem., medal, G. Vollmar, St. Louis.

Harness and Saddle Mountings.—1st. prem., $10, Vanblarcom & Felch, St. Louis.

Leather, (Best Display).—1st. prem., $25, L. A. Watkins, St. Louis.

Upper Leather, (a Side.)—1st. prem., dpl., Milwaukee Hide and Leather Co., by J. Clark & Co., St. Louis.

Calf Skins, Half Dozen.—1st. prem., dpl., Milwaukee Hide and Leather Co., J. Clark & Co., St. Louis.

Kip Skins.—1st. prem., dpl., Lockhaupt & Kiefer, Alleghany, Pa.

Gloves, Buckskin.—1st. prem., dpl., Gill & Murphy, St. Louis.

Mittens.—1st. prem., dpl., Gill & Murphy, St. Louis.

Bridle Leather, (Three Sides).—1st. prem., dpl., L. A. Watkins, St. Louis.

Harness Leather, (Two Sides).—1st. prem., dpl., Milwaukee Hide & Leather Co.; by J. Clark & Co., St. Louis.

Hair Bridle.—1st. prem., medal, J. Oesterly, St. Louis.

Penny Packer Collar.—1st. prem., medal, Donovan & Brunk, Dayton, Ill.

Hats and Caps, (Display).—1st. prem., $20, Lewis & Groshon, St. Louis.

Hats, Silk.—1st. prem., $10, Lewis & Groshon, St. Louis.

Caps, Fur.—1st. prem., $5, Lewis & Groshon, St. Louis.

Hats, (Fur or Felt).—1st. prem., $5, Lewis & Groshon, St. Louis.

Caps, (Cloth).—1st. prem., $5, Lewis & Groshon, St. Louis.

Umbrellas.—1st. prem., medal, Lewis & Groshon, St. Louis.

Collection Ladies' Furs.—1st. prem., and $10, Lewis & Groshon, St. Louis.

Guns, Pistols, &c., (Display).—1st. prem., dpl., and $50, R. Beauvais, St. Louis.

Fishing Tackle, (Display.)—1st. prem., medal, R. Beauvais, St. Louis.

Fish Seines.—1st. prem., medal, R. Beauvais, St. Louis.

Animal Traps.—1st. prem., medal, J. D. Summit, St. Louis.

Knives and Forks.—1st. prem., $10, Saml. Cupples, St. Louis.

Pocket Knives, (Display).—1st. prem., medal, Saml. Cupples, St. Louis.

Scissors, Best Assortment.—1st. prem., medal, Seymour & Co., New York; by Cheever, Burchard & Co., St. Louis.

Edge Tools, Best Display.—1st. prem., $10, A., F. Shapleigh & Co., St. Louis.

Cutlery, Best Display.—1st. prem., $25, Cheever, Burchard & Co., St. Louis.

Axes.—1st. prem., medal, A. F. Shapleigh & Co., St. Louis.

Drawing Knives.—1st. prem., medal, A. F. Shapleigh & Co., St. Louis.

Hatchets, Best Assortment.—1st. prem., medal, A. F. Shapleigh & Co., St. Louis.

Adzes.—1st. prem., medal, A. F. Shapleigh & Co., St. Louis.

Saws, Best Display, (Quality).—1st. prem., dpl. and $20, A. F. Shapleigh & Co., St. Louis.

Quail Nets.—1st. prem., medal, R. Beauvais, St. Louis.

Cross Bow.—1st. prem., medal, F. Barth, St. Louis.

Scales, Variety and Display.—1st. prem., $10, to Buffalo Scale Co.

Bank Vaults.—1st. prem., dpl. and $10, McNeal & Urban, St. Louis.

Locks for Banks.—1st. prem., dpl. and $10, Diebold & Kienzle, St. Louis.

Safes, Fire and Burglar proof.—1st. prem., dpl. and $25, Diebold & Kienzle, St. Louis.

Sieves.—1st. prem., medal, Saml. Cupples, St. Louis.

Best Lightning Rod, (Copper).—1st. prem., dpl., Cole Bros., St. Louis.

Best Lightning Rod, (Iron).—1st. prem., medal, Cole Bros., St. Louis.

Best Lightning Rod, (any Material).—1st. prem., dpl., and $10, Cole Bros., St. Louis.

Stoneware.—1st. prem., dpl. and $10, W. W. Hubbs, Whitehall, Illinois; by H. C. Benning, St. Louis.

Ground Glass.—1st. prem., $10, Withmar Glass Co., St. Louis.

Plate Glass.—1st. prem., $10, Pettis & Leathe, St. Louis.

Stained Glass.—1st. prem., $10, Sutter, & Bierwirth, St. Louis.

Flint Glass.—1st. prem., $10, Withmar Glass Co., St. Louis.

Glass Tubes.—1st. prem., dpl. and $10, Theodore Kalb, St. Louis.

Stoppered Bottles and Vials.—1st. prem., $10, Theodore Kalb, St. Louis.

Retorts and Receivers.—1st. prem., $10, Theodore Kalb, St. Louis.

Demijohns.—1st. prem., medal, Saml. Cupples, St. Louis.

Terra Cotta Ware.—1st. prem., dpl. and $10, H. M. Thompson & Co., St. Louis.

Files.—1st. prem., dpl. and $10, St. Louis Composition Granite Co.

Best Display Stone and Earthen Pipes.—1st. prem., and $10, H. M. Thompson & Co.

Best Display Useful and Ornamental Potter's Ware.—1st. prem., dpl. and $10, F. Dallas, Cincinnati, Ohio.

Gas Retorts.—1st. prem., dpl. and $10, Laclede Fire Brick Manufacturing Co., St. Louis.

Pressed Brick.—1st. prem., dpl. and $10, St. Louis Brick Co.

Stock Brick.—1st. prem., dpl. and $10, St. Louis Brick Co.

Paving Brick.—1st. prem., dpl., and $10, Joseph Busch, St. Louis.

Fire Brick.—1st. prem., dpl. and $10, Laclede Fire Brick manufacturing Co., St. Louis.

Furnace Tiles.—1st. prem., dpl. and $5, Laclede Fire Brick Manufacturing Co., St. Louis.

Best Specimen Apprentice Workmanship, 1871.—Dpl. and $25, Otto Newstadt, St. Louis.

Powder.—1st. prem., dpl., Laflin & Rand, Powder Co., St. Louis.

Paper Bags.—1st. prem., medal, Sam'l Cupples, St. Louis.

Life Boat.—1st. prem., medal, Wm. M. Frazer, St. Louis.

Earth Closets.—1st. prem., medal, to Earth Closet Co., Hartford, Conn., by Emmons & Campfield, St. Louis.

Easy Chair and Bed Combined.—1st. prem., medal, Bard & McRobbins, St. Louis.

Railroad Spikes.—1st. prem., medal, to E. S. Wheaton, Tredegar Co.,

Tire Cooler.—1st. prem., medal, to Edward Stadt meister, Cape Girardeau, Mo.

Clamp for Entering Blind Slats.—1st. prem., medal, James Church, St. Louis.

Blank Books.—1st. prem., medal, C. F. Chamberlin & Co., St. Louis.

Baker and Roaster.—1st. prem., medal, F. W. Hafkemeyer, St. Louis.

Stock Marker.—1st. prem., medal, R. H. Bacot & Co., St. Charles.

Stove Hole Thimble.—1st. prem., medal, E. C. Chapman, Lacon, Ill.

Books and Stationery.—1st. prem., medal, Hendricks & Chittenden, St. Louis.

Meat Safes.—1st. prem., medal, Aug. Knoche, St. Louis.

Scraper for Tubular Boilers.—1st. prem., medal, T. Christoffel, New York.

Barn Door Hanger.—1st. prem., medal, Pratt & Fox, manufacturing Co., St. Louis.

Coal oil Can.—1st. prem., medal, H. H. Gillam, St. Louis.

Childrens' Carriages.—1st. prem., medal, Wenkler & Meyer, St. Louis.

Indestructible Coating for Iron.—1st. prem., medal, G. M. Wyeth, St. Louis.

Syrup Gauge.—1st. prem., medal, J. H. Parkhurst, St. Louis.

Iron Tunnel, Sewer or Culvert.—1st. prem., medal, Geo. M. Wyeth, St. Louis.

Iron Buckets.—1st. prem., medal, Walker, Stiles & Co., Cincinnati, Ohio.

Measures for Coal.—1st. prem., medal, Walker, Stiles & Co., Cincinnati Ohio.

Crippled Soldiers' Wagon.—1st. prem., medal, H. G. Mottmiller, Havana, Ill.

Anti-Friction Car Wheel Journal.—1st. prem., medal, A. Higley, Cleveland Ohio.

Bed Springs.—1st. prem., medal, A. W. Oberman, Chicago.

Street Car Fare Box.—1st. prem., medal, Barenger, Wood & Co., St. Louis.

Marking Brands.—1st. prem., medal, F. Goebel, St. Louis.

Furniture Inlaid Work.—1st. prem., dpl., F. Goebel, St. Louis.

Bridle Bit.—1st prem., medal, Rich & Wheelan, Leavenworth, Kan.

Rotary Album.—1st prem., medal, Barnaby & Millard, New York, by J. L. Wilson, St. Louis.

Combination Crystal Fountain Adver-

tiser.—1st. prem., medal, J. C. Barr, St. Louis.

Street Naming Gas Lamp.—1st. prem., medal, B. Giroux, St. Louis.

Boot Heel Plate.—1st. prem., medal, B. Giroux, St. Louis.

Window Screen.—1st. prem., medal, B. Giroux, St. Louis.

Miniature House.—1st. prem., medal, Geo. A. Orcutt, St. Louis.

Model of Steamboat.—1st. prem., medal, W. S. Nelson, St. Louis.

Portable Gas Fixtures.—1st. prem., medal, Isaac Cook & Co., St. Louis.

Automatic Dripping Coffee Pot.—1st. prem., medal, Isaac Cook & Co., St. Louis.

Book Binding.—1st. prem., medal, S. W. Book Publishing Company, St. Louis.

Wool Carpet.—1st. prem, medal, Newcomb Bros., St. Louis.

Osier Willow.—1st. prem., medal, Geo. Miller, Belleville, Ill.

Kid Gloves.—1st. prem., medal, Theo. Ehrhardt, St. Louis.

Colt Skin Gloves.—1st. prem., medal, Theo. Ebrhardt, St. Louis.

Lambskin Gloves.—1st. prem., medal, Ehrhardt, St. Louis.

Vegetable and Fruit Slicer.—1st. prem., medal, G. B. Massey, New York.

"O. K." Fire Kindler.—1st. prem., medal, J. B. King, Ill.

Adjustable Scaffold.—1st. prem., medal, A. J. Haerner, Pittsfield, Ill.

Wooden Shoes.—1st. prem., medal, H. Schaeffer, Washington, Mo.

Soda Bottle Corks.—1st. prem., medal, Jno. Matthews, New York, by J. H. Parkhurst, St. Louis.

FAIR OFFICE—ST. LOUIS TIMES.

CLASS D.

PRODUCTS OF THE FIELD AND GARDEN, FOOD, &c.

R. S. FARRAR, SUPERINTENDENT.

This department brings us back to first principles. The stomach is a very essential part of the animal organization, and the first pressing demand of our nature, is for something to eat. In a condition of original simplicity, or rather savagery, man's wants are very few, and easily supplied. In the semi-tropical regions, mother earth offers a bountiful supply of food in the shape of fruits and nuts, and a tolerable substitute for clothing in fig leaves, the inside bark of some trees, &c. But a single advance from the condition of mere savagery, creates new wants and new demands for their supply. Mother earth must be coaxed and cultivated; gardens must be planted and fields must be sowed; the simple savage observes the regular recurrence of "seed time and harvest," and learns "to eat his bread in the sweat of his brow." In those rude days people were social agrarians as intimated in the doggerel lines:

"When Adam delved and Eve span,
Who was then the gentleman?"

But this state of things lasted but a brief period. If mother earth would yield a few peanuts by having her sides tickled with a sharp stick, she would do much better—bringing a harvest of wheat and corn, and fruit and wine, when well treated. Rude iron implements took the place of sharp sticks, lands were divided amongst cultivators, and slow advances were made towards the comparative perfection of modern agriculture.

This department of the Fair contains a vast number and variety of articles, and the good taste and energy of the Superintendent, have arranged them in groups, so that the exhibition, which occupies a large section of the old amphitheatre, is as attractive in appearance, as it is inviting to those who love to see raw esculents transformed into good food. Here is an immense variety of articles that enter into the daily consumption of families, ranging all the way from plain "hog and hominy;" from the bread that is "the staff of life," up to those delicate confections made by the fair hands of the daughters of Eve, and those rare wines that "make glad the heart of man." The ladies always do their part well, and ten year old boys, who have

an eye to cake, jelly and jam, would fairly revel with delight in this wilderness of sweets.

LEADING ARTICLES ON EXHIBITION.

The display in this division was superior in arrangement and quality. Two large pyramids, formed from seeds in jars, are very neat, and attract much attention. These collections contain each about four hundred specimens. There are also some admirable specimens of seeds by the peck. The exhibition of vegetables is unusually fine, considering the dry season, the entries being very numerous. Irish potatoes of various kinds for general and private premiums; pumpkins, squashes, celery, rhubarb, cabbage, beets, cucumbers, tomatoes, parsnips, onions, turnips, egg plant, Lima beans, lettuce, carrots, cauliflowers. Large collections of vegetables exclusive of potatoes and celery, raised in Missouri, are among the most prominent articles in this department. Many varieties of sweet potatoes are shown, one specimen requiring but twelve potatoes to the bushel. Several entries in the flour department were made for private and general premiums.

In the way of tobacco and cigars, there are several large cases of pressed natural leaf, globes of fine-cut and jars of snuff, while a perfect cabin, surrounded by a picket fence, is formed entirely of cigars.

Bags, bagging, hemp, twine, rope and cord are piled up for inspection.

In native wines, the collections are handsome and large. The premiums to be awarded in this department are very fair, and have induced much competition.

One of the most interesting, and at the same time most novel displays, is made by Mr. W. Weston, land agent of the Kansas Pacific Railway Company. He shows products of the "Great American Desert," which consist of corn, wheat, sorghum, Hungarian grass, and young trees raised on the experimental farm at Wilson Creek station, 240 miles west of Kansas City, Mo., by Mr. Elliott, industrial agent of the company, together with specimens of all the natural grasses indigenous to that district, and broom corn, sorghum, peanuts, squashes, &c., raised at Ellis, 300 miles west of Kansas City, without irrigation. The seedling trees exhibited, which were also raised by Mr. Elliott at Wilson's Creek, would do credit to any Eastern nursery. He has a sod of Buffalo grass upwards of a foot thick, showing the verdure and the soil which is of much interest to the many who are now looking toward the far West. On each side hangs a buffalo horn, containing a bouquet of grasses, and forming a very effective and novel cornucopia. The whole is surmounted by the head of an enormous old buffalo bull, who looks grimly down over the products of his native heath so lately wrested from him.

AWARDS IN CLASS D.

Mustard Seed, (Peck).—1st prem., $5, Barnum, Kennett & Co., St. Louis.

Timothy Seed, (Peck).—1st prem., $5, Jno. J. Matthews, St. Louis Co.

Clover Seed, (Peck).—1st prem., $5, L. G. Pratt & Co., St. Louis.

Blue Grass Seed, (Peck).—1st prem., $5, Barnum Kennett & Co., St. Louis.

Orchard Seed, (Peck).—1st prem., $5, L. G. Pratt & Co., St. Louis.

Hungarian Grass Seed, (Peck).—1st prem., $5, L. G. Pratt & Co., St. Louis.

Flax Seed, (Peck).—1st prem., $5., Barnum, Kennett & Co., St. Louis.

Millet Seed, (Peck).—1st prem., $5, Barnum, Kennett & Co., St. Louis.

Hemp Seed, (Peck).—1st prem., $5, L. G. Pratt & Co., St. Louis.

Best Collection Seeds, (not less than 50 samples).—1st prem., $20, L. G. Pratt & Co., St. Louis.

Irish Potatoes, (for table use).—1st prem., $10, Samuel Stratton, Litchfield, Ill.; 2nd prem., $5, to same.

Sweet Potatoes.—1st prem., $10, Samuel Stratton, Litchfield, Ill.; 2nd prem., $5, O. L. Burdick, St. Louis Co.

Best and Largest Collection Garden Vegetables, (Potatoes excepted).—1st prem., $25, Eccles & Thompson, St. Louis.

Best Pumpkins or Squashes.—1st prem., $5, R. Wash, St. Louis Co.

Best twelve stalks Celery.—1st prem., $10, Eccles & Thompson, St. Louis.

Best twelve stalks Rhubarb.—1st prem., $5, Eccles & Thompson, St. Louis.

Best collection of Beets.—1st prem., $5, Eccles & Thompson, St. Louis.

Best twelve Cucumbers.—1st prem., $5, Eccles & Thompson, St. Louis.

Best Tomatoes.—1st prem., $5, Eccles & Thompson, St. Louis.

Best twelve Parsnips.—1st prem., $5, Eccles & Thompson, St. Louis.

Best Onions.—1st prem., $5, E. G. Mudge, Ill., by F. F. Rozier, St. Louis.

Best Turnips, (half peck).—1st prem. $5, Eccles & Thompson, St. Louis.

Best Lima Beans.—1st prem., $5, Annie V. Botts, St. Louis.

Best six Egg Plants, (Fruit).—1st prem., $5, Eccles & Thompson, St. Louis.

Best twelve heads Lettuce.—1st prem., $5, Adolphus Meier, St. Louis.

Best Carrots.—1st prem., $5, Eccles & Thompson, St. Louis.

Best and largest collection Vegetables, (Southern Hotel Premium).—1st prem., $20, Eccles & Thompson, St. Louis.

Best twelve stalks Celery.—1st prem., $5, Eccles & Thompson, St. Louis.

Largest collection Vegetables (Laclede Hotel).—1st prem., $20, Eccles & Thompson, St. Louis.

Best twelve stalks Celery raised in Missouri.—1st prem., $5, Eccles & Thompson, St. Louis.

Best twelve stalks Celery, (Planter's House Premium).—1st prem., $5, Eccles & Thompson, St. Louis.

Best bushel Irish Potatoes.—1st prem., $10, Anton Becherer, Elleardsville, Mo.

Best bushel Sweet Potatoes, (Barnum's Hotel Premium).—1st prem., $5, O. L. Burdick, St. Louis Co.

Best Leek.—Premium, Adolphus Meier, St. Louis.

Pop Corn.—Prem., $2, Nicholas Homyer, Illinois.

Barrel of Flour.—1st prem., dpl. and $20, Pearl Mills, by Davis and Emmory, St. Louis; 2nd prem., silver medal, Weinhold & Son, Perry Co., Mo.

Barrel Corn Meal.—1st prem., medal dipl. and $10, Engelke & Feiner; 2nd prem., silver medal, Wood, Maude & Co., St. Louis.

Bushel Hominy.—1st prem., $5, Wood, Maude & Co., St. Louis.

Best Barrel White Corn Meal, (Barnum's Hotel Premium).—1st prem., $10, Wood, Maude & Co., St. Louis.

Fall Wheat, (Bushel).—1st prem., $10. Jas. Wilderman, St. Clair Co., Ill.; 2nd prem., $5, Geo. A. Deitz, Chambersburg, Pa.

Bushel Rye.—1st prem., $5, J. Balzer, Kimmswick, Mo.

Bushel Oats.—1st prem., $5, Jas. Mitchell, St. Clair Co., Ill.

Starch from Wheat.—1st prem., $5, Mr. Watts, Madison, Ind., by Husbands Bros., St. Louis.

Corn Starch.—1st prem., $5, Mr. Watts, Madison, Ind., by Husbands Bros., City.

Potato Starch.—1st prem., $5, Mr. Watts, Madison, Ind., by Husbands Bros.

Fall Barley.—1st prem., $5, Jas. R. Miller, St. Clair Co., Ill.

Spring Barley.—1st prem., $5, J. H. Paullin, Atlanta, Ill.

Corn, (one bushel).—1st prem., $10, Jas. Wilderman, St. Clair Co., Ill.; 2nd prem., $5, Wm. Berry, St. Louis Co.

Sugar cured Ham.—1st prem., dipl. Thos. J. Bigger, Kansas City.

Cheese, over one year old.—1st prem. $5, C. D. Holt, Wis., by Hudson Bros. St. Louis.

Ten pounds Fresh Butter.—1st prem. $10, Mrs. Levin H. Baker, St. Louis.

Twenty pounds May Butter.—1st prem. $10., Mrs. J. W. Barnwell, Oregon, Ill.

Ten pounds Kettle rendered Lard.—1st prem., $5, Mrs. J. Ramsay, St. Louis Co.

Sorghum Molasses.—1st prem., $5, D. B. Neal, St. Louis; 2nd prem., $2, Geo. Paul, Eureka, Mo.

Honey, (five pounds).—2st prem., $5, J. H. Looney, St. Louis.

Twenty pounds Butter, (Planters' House.) 1st prem., $20, Miss J. Davis, Charleston, Iowa.

Sugar cured Ham, (Barnum's Hotel).—1st prem., $10, Barter & Whitehouse, Chicago, Ill.

Twenty-five pounds Fresh Butter. (Southern Hotel).—1st prem., $25, Mrs. Switzer, St. Louis Co.

Ten pounds Honey, (St James Hotel.)—1st prem., $5, John J. Matthews, St. Louis Co.

Best and largest Display Honey, with

Statement of Bee Culture, (Premium by J. H. Gisler, St. Louis).—Prem. $10, to C. N. Vandervoort, Bloomington, Ill.

Best Honey Extractor, (by same).—1st prem., $10, I. Fisher, St. Louis.

Ham Sausage.—1st prem., $25, (offered by J. A. Smith, Union Market), Frederick Glaser, Cincinnati, O.

Twenty pounds Butter, Missouri make, (Laclede Hotel Premium).—1st prem., $10, Mrs. J. Ramsay, St. Louis Co.

Twenty pounds Cheese, (Missouri make).—1st prem., $10, A. & W. D. Perry, Payson, Ill.

Five pounds Honey.—1st prem., $5, C. N. Vandervoort, Bloomington, Ill.

Best Preserved Peaches.—1st prem., $5, Mrs. Switzer, St. Louis Co.; 2nd prem., Josephine Halsted, St. Clair Co., Ill.

Tomatoes, (Preserved).—1st. prem., $5, Mrs. Miron, St. Louis; 2nd. prem., $2, Mrs. J. L. Fant, Warrenton, Mo.

Grapes, (Preserved).—1st. prem., $5, Mrs. J. L. Fant, Warrenton, Mo.; 2nd. prem., $2, Mrs. Dr. Spalding, Kirkwood, Missouri.

Pears, (Preserved).—1st. prem., $5, Mrs. R. Thompson, Jefferson City, Mo.; 2nd. prem., $2, Mrs. Dr. Spalding, Kirkwood, Missouri.

Quinces, (Preserved).—1st. prem., $5, Mrs. J. H, Jones, St. Louis; 2nd. prem., $2, Mrs. Dr. Spalding, Kirkwood.

Cherries, (Preserved).—1st. prem., $5, Miss Josephine Halsted, St. Clair Co., Ill.; 2nd. prem., $2, Mrs. Dr. Spalding, Kirkwood., Mo.

Citrons, (Preserved).—1st. prem., $5, Mrs. Dr. Spalding, Kirkwood, Mo.; 2nd. prem., $2, Mrs. S. Cole, Jefferson Co., Mo.

Gooseberries, (Preserved).—1st. prem., $5, Mrs. R. F. Patten, Paris, Ill.; 2nd. prem., $2, Mrs. Dr. Spalding, Kirkwood, Missouri.

Apple Butter.—1st. prem., $5, Miss E. Halsted, Shiloh, Ill.; 2nd. prem., $2 Mrs. M. E. Payne, St. Louis.

Pear Butter.—1st. prem., $5, Miss Josephine Halsted, St. Clair Co., Ill.; 2nd. prem., $3, Mrs. R. Thompson, St. Louis.

Peach Butter.—1st. prem., $5, Mrs. E. Halsted, Shiloh, Ill.; 2nd. prem., $2, Miss Josephine Halsted, St. Clair Co., Illinois.

Tomato Butter.—1st. prem., $5, Mrs. E. Halsted, Shiloh, Ill.; 2nd. prem., $2, Mrs. M. E. Payne, St. Louis.

Currant Jelly.—1st. prem., $5, Mrs. Basil Duke, St. Louis; 2nd. prem., $3, Mrs. J. L. Fant, Jefferson City.

Plum Jelly.—1st. prem., $5, Mrs. M. A. Gillespie, Edwardsville, Ill.; 2nd. prem., $3, Mrs. J. M. McKage, Gray's Summit.

Raspberry Jelly.—1st. prem., $5, Mrs. Dr. Spalding, St. Louis Co; 2nd. prem., $3, Mrs. J. McReilly, St. Louis.

Strawberry Jelly.—1st. prem., $5, Mrs. Wright Smith, St. Louis Co.; 2nd. prem., $3, Mrs. Dr. Spalding, Kirkwood, Missouri.

Gooseberry Jelly.—1st. prem., $5, Mrs. Dr. Spalding, Kirkwood, Mo.; 2nd. prem., $3, Mrs. M. C. Newton, Springfield, Missouri.

Cherry Jelly.—1st. prem., $5, Mrs. M. T. Ford, St. Louis; 2nd. prem., $3, Mrs. R. Thompson, St. Louis.

Grape Jelly.—1st. prem., $5, Mrs. Wright Smith, St. Louis Co.; 2nd. prem., $3, to same.

Cranberry Jelly.—1st. prem., $5, Mrs. Basil Duke, St. Louis; 2nd. prem., $3, Miss J. McReilly.

Quince Jelly.—1st. prem., $5, Mrs. S. Gale, Jefferson Co., Mo.; 2nd. prem., $3, Mrs. J. L. Fant, Warrenton, Mo.

Apple Jelly.—1st. prem., $5, Mrs. R. Thompson, St. Louis; 2nd. prem., $3, Mrs. Isaac H. Jones, St. Louis.

Catsup.—1st. prem., $5, Mrs. Basil Duke, St. Louis; 2nd. prem., $3, Miss Mary Dillon, St. Louis.

Siberian Crab Jelly.—1st. prem., $5, Mrs. D. W. Graham, St. Louis; 2nd. prem., $3, L. L. Haworth, Decatur, Ill.

Best Variety of Jellies, (Premium by St. Nicholas Hotel).—1st. prem., $10, Mrs. R. Thompson, St. Louis.

Pickles, (Catsup and Sauces—Made in U. S.)—1st. prem., dpl. and $10, J. J. Squire, De Soto, Mo.

Preserved Berries.—1st. prem., dpl. and $5, Jno. J. Squire, De Soto, Mo.

Pickles.—1st. prem., $5, Miss A.

Oliver, St. Louis; 2nd. prem., $3, Mrs. Dr. Montgomery, St. Louis.

Preserved Stone Fruit.—1st, prem., dpl. and $5, J. J. Squire, De Soto, Mo.

Preserved Seed Fruit.—1st. prem., dpl. and $5, J. J. Squire, De Soto, Mo.

Hermetically Sealed Vegetables.—1st. prem., dpl. and $5, Jno. J. Squire, De Soto, Missouri.

Best and Largest Variety of Hermetically Sealed Vegetables by one Exhibitor.—1st. prem., dpl. and $10, Jno. J. Squire, De Soto, Mo.

Largest Variety of Preserved Fruits by one Exhibitor.—1st. prem., dpl. and $10, Jno. J. Squire, De Soto, Mo.

Wheat Bread, (Four Loaves).—1st. prem., $5, Mrs. F. W. Meyer, St. Louis.

Rye Bread, (Four Loaves).—1st. prem., $5, Mrs. Bessler, St. Louis.

Pound Cake.—1st. prem., $10, Martha A. Gillespie, Edwardsville, Ill; 2nd. prem., $5, Miss J. H. Kelton, Kirkwood, Missouri.

Sponge Cake.—1st. prem., $10, Mrs. C. J. Morton, St. Louis; 2nd. prem., $5, Mrs. F. W. Meyer, St. Louis.

Fruit Cake.—1st prem., $10, Mrs. Martha A. Gillespie, Edwardsville, Ill., 2nd. prem., $5, Miss Sallie Busby, City.

Jelly Cake.—1st. prem., $10, Miss Mattie Ramsay, St. Louis; 2nd. prem., $5, Mrs. Dr. Gregory, St. Louis.

Best Piece of Confectionery.—1st. prem., dpl., $15, F. Walter & Co., St. Louis.

Best Assortment of Candy.—1st. prem., dpl. $10, Blanke & Bro., St. Louis.

Chocolate.—1st. prem., $5, J. Webb & Co., Boston, Mass., by Hudson Bros., St. Louis.

Best and Largest Variety, Pate d' Italia Macaroni and Vermicelli.—1st. prem., dpl., $15, L. Ballagamba, City.

Soda Crackers.—1st. prem., dpl., Jno. S. Dunham, St. Louis.

Pic-Nic Crackers.—1st. prem., A. Weyel & Co., St. Louis.

Boston Crackers.—1st. prem., dpl., Jno. S. Dunham, St. Louis.

Best Assortment of Crackers—1st. prem., dpl., $10, A. Weyel & Co., St. Louis.

Two Loaves Home-made Bread (St. James Hotel Premium.)—1st. prem., $5, Miss Sarah Jones, St. Louis.

Pound Cake, By a Lady of St. Louis, (Southern Hotel Premium.)—1st. prem., $5, Miss Mattie Ramsay, St. Louis.

Rusks, by a Girl Eight Years Old.—Premium to Miss Mabel Wilson, St. Louis.

Chocolate Cake.—Premium to Miss Bettie Buskett, St. Louis.

Hard Pressed Tobacco.—1st. prem., dpl., $20, Roche & McCabe, St. Louis.

Snuff.—1st. prem, dpl., C. W. Dieterich, St. Louis.

Hard Pressed Natural Leaf.—1st. prem., dpl., $20, Loker Tobacco Co., St. Louis.

Fine Cut Chewing Tobacco.—Dpl., Leggett, Hudson & Co.

Box of Cigars.—1st. prem., dpl., $20, Fehl & Bro., St. Louis.

Miniature House of Cigars.—Dpl., Johnny Ray, St. Louis.

Smoking Tobacco—1st. prem., dpl. J. W. Carroll, Lynchburg, Va., by R. W. Durkan, St. Louis.

Hemp Bagging.—1st. prem., dpl., $10, Southern Mills Bagging Co., St. Louis.

Twine.—1st. prem., dpl., $10, Henry Lammers, St. Louis.

Rope.—1st. prem., dpl., $10, Saml Cupples, St. Louis.

Cord.—1st. prem., dpl., $10, Chas. Heckel, St. Louis.

Bags and Bagging.—Bemis, Brown & Co., on exhibition—honorable mention.

Lager Beer.—1st. prem., dpl., and $20, Brinckwirth & Griesedieck, Lafayette Brewery, St. Louis; 2nd. prem., silver medal, S. Wainwright & Co., St. Louis.

Pale Ale.—1st. prem., dpl., and $20, B. F. Young, St. Louis.

Best Collection Native Wines.—1st. prem., dpl., and $20, American Wine Co., St. Louis; 2nd prem., Poeschel & Scherer, Hermann, Mo.

Sparkling Catawba.—1st. prem., dpl., and $20, American Wine Co.; 2nd. prem., $10, Pleasant Valley Wine Co., New York.

Still Catawba.—1st. prem., $20, Amer-

ican Wine Co., St. Louis; 2nd. prem., $10, Poeschel & Scherer.

Best White Concord.—1st. prem., $20, Isidor Bush & Co., St. Louis; 2nd. prem., $10, Poeschel & Scherer, St. Louis.

Best Sparkling Wine (Any Grape).—1st. prem., dpl., and $20, American Wine Co., St. Louis; 2nd. prem., $10, Pleasant Valley Wine Co., New York.

Best Sparkling Concord.—1st. prem., dpl., and $20, American Wine Co., St. Louis.

Norton's Virginia Wine.—1st. prem., $20, Poeschel & Scherer, Hermann; 2nd prem., $10, T. Claggett, St. Louis.

Clinton Wine.—1st. prem., $20, Poeschel & Scherer, Herman, Mo.; 2nd. prem., $10, Clagget, St. Louis.

White Wine from any Grape.—1st. prem., $20, Provines, Bissell & Co., St. Louis; 2nd. prem., $5, same.

Red Wine from any Grape.—1st. prem., $10, Isidor Bush & Co., St. Louis; 2nd. prem., $5, Provines, Bissell & Co., St. Louis.

Cider.—1st. prem., $10, Charles Quinette, St. Louis.

Delaware Wine.—1st. prem., $20, Isidor Bush & Co., St. Louis; 2nd. prem., $10, H. Bachman & Co., Cape Girardeau, Mo.

Herbemont Wine.—1st. prem., $20, Isidor Bush & Co.; 2nd. prem., $10, Poeschel & Scherer, Hermann, Mo.

Ives Seedling Wine.—1st. prem., $20, Poeschel & Scherer, Hermann, Mo.

Red **Concord.**—1st. prem., $20, T. Claggett, St. Louis; 2nd. prem., $10, Koenig & Gast, St. Louis County.

Wine or Berry Cordial.—1st. prem., $5, John J. Squire, De Soto, Mo.

Sparkling Clinton.—1st. prem., dpl., American Wine Company.

Sparkling Virginia Rosa.—1st. prem., dpl., American Wine Company.

FAIR OFFICE—MISSOURI DEMOCRAT.

CLASS E.

FRUITS AND FLOWERS.

JNO. J. O'FALLON, SUPERINTENDENT.

Fruits and flowers—flowers and fruits—what a delightful combination is this! Pomona and Flora, two fair goddesses, presiding over beautiful displays from their different dominions—displays that are ravishing to the sight, smell and taste of all visitors, and the whole exhibition under the careful arrangement and supervision of a clever gentleman, of rare good taste, who is full of the spirit of the occasion. This is the fairest spot in all the Fair. The air seems loaded with perfumes from "Araby the blest." The aroma from the choicest varieties of ripe fruit, and the fragrance from a perfect wilderness of rare flowers, regale the senses with their united charms. The pillars support clambering vines, while the floor becomes a great garden, filled with parterres of the rarest and most beautiful flowers. From the high ceiling are suspended baskets with hanging vines that fall gracefully downward; and other vines climb up amidst the evergreens, and the whole exhibition is like a fairy scene, filled with a thousand attractions and fascinations—a place where the eye revels amidst fresh and ever changing beauties.

The long tables are loaded with beautiful specimens of the finest fruits from the garden, orchard and vineyard. Apples, pears, peaches and grapes in the perfection of fresh maturity, looking so tempting and luscious, that every beholder would like to be appointed chairman of a tasting committee, to see if these wonderful productions of nature are as charming to the palate as to the eye.

Looking at the hundreds of varieties of choice apples, one marvels at the progress made in fruit culture, since the days when Adam and Eve pursued the very pleasant occupation of cultivating Eden. It is most likely too, that it was nothing better than a wild crab that Eve plucked and Adam ate, for a ripe golden pippin would never have left such an ugly bump in his throat, as tradition says was caused by the forbidden apple. Think what the pear has come to from the miserable wild choke pear, about as eatable as a green persimmon. Think of that small, but most delicious variety, the Seckel, and then of the glorious Bartlett, and a hundred other choice varieties—think of those wonderful specimens from California—wonderful alike for their size and beauty. Then think of the great velvety skinned,

delicately tinted peach, so fair to look upon, so delicious to taste, and remember that it has reached this apparent perfection from a bitter almond.

It is pleasant too, to know that this perfection is only apparent and comparative. Thousands of intelligent fruit culturists are all the time busy with hand and brain, to produce new and superior varieties of all the different classes of fruit. The gardener and vineyardist of a hundred years hence, may laugh at our supposed perfection, and produce specimens as far in advance of us, as our best productions are superior to the original stock of five thousand years ago. There is no telling what "natural selection" and hybridization may yet bring us to, both amongst plants and animals. We cannot make men out of monkeys, but we can transform the coarser types of both plants and animals, into those of a much higher quality, though of the same original species. In this way there is a broad field open for the efforts of all careful observers and experimenters.

GRAPES IN MISSOURI.

Nothing shows a grander progress in Missouri than grape culture and wine growing. Thirty years ago there was not a vineyard—properly so called—in the State, and not a barrel of wine made in a year. Now there are more than a thousand acres of vineyard, and every autumn pours forth a great flood of native wine. In the early planting of grapes in Missouri, the Catawba and Isabella were about the only varieties known, as worthy of cultivation. The former produced an excellent wine, and was a very choice table grape—in this last respect perhaps equal to any of the hundred varieties since introduced. But the Catawba, either from mismanagement, or from natural feebleness of constitution, showed such signs of weakness, and such a disposition to blight, that after a few years it was generally abandoned for more hardy varieties. Amongst these the Concord has become a general favorite, and is more cultivated than all other kinds together. The vine is wonderfully prolific, and comparatively free from disease. The Concord grape, for table purposes, has scarcely a superior, and it makes a light wine, fully equal to the Claret we generally get in this country.

LOCALITIES OF VINE GROWING.

The Germans at Hermann, in Gasconade County, were the first to prove the adaptation of the Missouri soil and climate to the culture of grapes; and vineyards at that point were well under way before similar efforts were made in other portions of the State. About twenty years ago, Wm. Haas, an intelligent German, a classmate and companion of the great chemist Liebig, showed that the river hills about Boonville in Cooper County, were admirably adapted to grape culture, and large vineyards are growing and bearing in that vicinity. During the last few years the cultivation of the grape has

greatly increased, and vineyards are planted in almost every section of the State. The most promising portion of our territory however, is that which was formerly considered almost worthless. Much of the broken land lying in the Southern half of Missouri, and known as the Ozark Hills, is admirably suited to the purpose in question. The gravelly soil of the warm hill-sides in that portion of the State, produces the very finest grapes in the whole country, and the time is not distant when the combined product from the mines and vines of South Missouri will equal in value any other single product of the whole State.

THE FLOWER SHOW.

Flowers are as true a type of civilization and refinement, as any one thing that can be named. If you are traveling through a wild wilderness, and come to a rude log cabin with trailing vines over the door, and some simple flowers in the little garden patch, you may feel sure of finding both intelligence and refinement within. Flowers are symbols of heavenly purity and love, and no base nature can have fondness for one or the other.

The exhibition of flowers at the present Fair is most creditable to all the parties interested. Some of the displays are so beautiful that we cannot do justice to them, and can only imitate the astonished and delighted child, that gazed entranced upon the rainbow glories of the scene, and then exclaimed: "Beautiful, beautiful!"

AWARDS IN CLASS E.

Plate Fall Apples, (18 entries).—1st prem., $10, E. Halsted, Shiloh, Ill.; 2nd prem., $5, Mrs. E. J. Halsted, St. Clair Co., Ill.

Plate Winter Apples, (84 entries).—1st prem., $10, Fred. Exter, Shiloh, Ill.; 2nd prem., $5, Mrs. E. J. Halsted, St. Clair Co., Ill.

Plate Seedling Apples, (6 entries).—1st prem., $5, E. P. Long, St. Louis Co.

Apples, best collection, (3 entries).—1st prem., $20, J. S. Nanson, St. Louis Co.

Plate Autumn Pears, (8 entries).—1st prem., $15, Archibald Douglas, St. Louis; 2nd prem., $10, Isidor Bush & Son, Bushberg, Mo.; 3rd prem., $5, F. Braches, Gray's Summit, Mo.

Winter Pears, (9 entries).—1st. prem., $10, E. R. Mason, St. Louis Co.

Collection Pears.—1st prem., $15, Isidor Bush & Son, Bushberg, Mo.

Plate Peaches, (9 entries).—1st prem., $10, G. A. Drunsfeld, St. Louis; 2nd prem., $5, S. Wright, Jefferson Co., Mo.

Plate Seedling Peaches.—1st prem., $5, Chas. Lenori, St. Louis.

Quinces, two plates, (11 entries).—1st prem., $10, Jas. H. Gisler, St. Louis Co. 2nd prem., $5, Lewis P. Andrews, St. Louis.

Catawba Grapes, (5 bunches), 7 entries.—1st prem., $5, J. J. Kelly, Webster, Mo.

Concord Grapes, (5 bunches), 9 entries.—1st prem., $5, F. Nagel, St. Louis Co.

Norton's Virginia, (5 bunches), 6 entries.—1st prem., $5, T. Claggett, St. Louis Co.

Ives Grapes, (5 bunches), 3 entries.—1st prem., $5, Cliff Cave Wine Co., Mo.

Delaware, (5 bunches), 2 entries.—1st prem., $5, Isidor Bush & Son, Bushberg, Mo.

Herbemont, (5 bunches), 3 entries.—1st prem., $5, Isidor Bush & Son, Bushberg, Mo.

Cynthiana, (5 bunches), 4 entries.—1st prem., $5, Isidor Bush & Son, Bushberg, Mo.

Martha, (5 bunches).—1st prem., $5, Isidor Bush & Son, Bushberg, Mo.

Best Collection Native Grapes, 3 entries.—1st prem., $20, Isidor Bush & Son, Bushberg, Mo.; 2nd prem., $10, Frank Nagel, St. Louis Co.

Grapes on One Vine.—1st prem., $10, Isidor Bush & Son, Bushberg, Mo.

Best five bunches Grapes, (by Planter's House).—1st prem., $5, Isidor Bush & Son, Bushbe r. Mo.

Best ten pounds Grapes, (by Southern Hotel).—1st prem., $10, Isidor Bush & Son, Bushberg, Mo.

Best Collection Peaches, (by St. Nicholas Hotel).—1st prem., $10, S. Wright, Hillsboro, Mo.

Best Collection Greenhouse Plants.—Dpl. and $50, Wm. Schray, St. Louis Co.

Best arranged Group Greenhouse Plants.—Dpl. and $30, Louis Rindfleisch, St. Louis.

Best ten varieties Greenhouse Plants in bloom.—1st prem., $20, Wm. Schray, St. Louis Co.; 2nd prem., $10, Louis Rindfleisch, St. Louis.

Best Collection Hothouse Plants.—1st prem., $20, Wm. Schray, St. Louis Co.; 2nd prem., $10, Louis Rindfleisch, St. Louis.

Plants with variegated Foliage.—1st prem., $10, Louis Rindfleisch, St. Louis.

Best Variety Plants with Variegated Foliage.—1st prem., $10, W. A. Syred, St. Louis; 2nd prem., $5, Wm. Schray, St. Louis.

Best single specimen of Plant with Variegated Foliage.—1st prem., $5, J. M. Jordan, St. Louis; 2nd prem., $2, W. A. Syred, St. Louis.

Best single specimen in or out of bloom.—1st prem., $5, Louis Rindfleisch, St. Louis.

Variety of Caladiums.—1st prem., $10, Louis Rindfleisch, St. Louis.

Coleus, (6 plants in variety).—1st prem., $5, W. A. Syred, St. Louis; 2nd prem., $3, J. M. Jordan, St. Louis.

Begonias, (variety). — 1st prem., $5, Louis Rindfleisch, St. Louis.

Carnations, (3 varieties).—1st prem., $5, Wm. A. Syred, St. Louis.

Geraniums, (12 varieties).—1st prem., $5, Wm. Schray, St. Louis; 2nd prem., $3, Wm. A. Syred, St. Louis.

Geraniums, variegated.—1st prem., $5, Wm. A. Syred, St. Louis.

Verbenas, (20 varieties).—1st prem., $10, Wm. Schray, St. Louis; 2nd prem., $5, E. R. Miltenberger, St. Louis.

Verbenas, (12 Varieties, 3 Entries).—1st. prem., $5, J. M. Jordan, St. Louis; 2nd. prem., $3, Wm. Schray, St. Louis.

Roses, (3 Varieties, 4 Entries).—1st. prem., $7, C. Cannon, Webster Groves; 2nd. prem., $5, W. A. Syred, St. Louis County.

Running Plants, (In Flower).—1st. prem., $10, Wm. Schray, St. Louis; 2nd. prem., $5, W. A. Syred, St. Louis.

Running Plants, (Not in Flower).—1st. prem., $5, Wm. Schray, St. Louis; 2nd. prem., $3, W. A. Syred, St. Louis.

Varieties for Ornamenting Urns, (In Flower).—1st. prem., $5, Wm. Schray, St. Louis; 2nd. prem., $3, E. R. Miltenberger, St. Louis.

Varieties for Ornamenting Urns, (Not in Flower).—1st. prem. $5, J. M. Jordan, St. Louis; 2nd. prem., $3, Louis Rindfleisch, St. Louis.

Floral Designs, (Natural Flowers).—1st. prem., $10, W. A. Syred, St. Louis; 2nd. prem., $5, E. R. Miltenberger, St. Louis.

Floral Designs, (Dried Flowers).—1st. prem., $10, E. R. Miltenberger, St. Louis.

Large Vase Growing Plants.—1st. prem., $10, C. Cannon, Webster Groves.

Rustic Stand, (With Plants).—1st. prem., $10, J. M. Jordan, St. Louis Co.

Pair Hanging Baskets.—1st. prem., $5, J. M. Jordan, St. Louis Co; 2nd. prem., $3, L. Reindfleisch, St. Louis.

Rustic Designs and Garden Furniture.—1st. prem., $10, James King, New Haven, Conn.; 2nd. prem., (4 designs) $5, J. M. Jordan, St. Louis.

Roses, (Largest, and Best Varieties).—1st. prem., $10, Louis Reindfleisch, St. Louis.

Roses, (24 Varieties).—1st. prem., $10, Louis Reindfleisch, St. Louis.

Roses (12 Varieties).—1st. prem., $5, Louis Reindfleisch, St. Louis.

Tea Roses, (12 Varieties).—1st. prem., $10, Louis Rindfleisch, St. Louis.

Dahlias, (Best Display). — 1st. prem., $10, E. R. Miltenberger, St. Louis.

Dahlias, (24 Varieties). — 1st. prem., $10, E. R. Miltenberger, St. Louis.

Bouquet, (Dahlias).—1st. prem. $7, E. R. Miltenberger, St. Louis.

Gladiolus, (Largest Collection). — 1st. prem., $5, Wm. Schray, St. Louis.

Tube Roses, (Arranged in Baskets).— 1st. prem., $5, W. A. Syred, St. Louis.

Pair Hand Bouquets, (4 Entries, Oval without Lace.)—1st. prem. $10, J. M. Jordan, St. Louis; 2nd. prem. $5, Wm. Schray, St. Louis.

Pair Pyramidal Bouquets.—1st. prem. $10. Wm. Schray, St. Louis; 2nd. prem. $5, J. M. Jordan, St. Louis.

Pair Hand Bouquets.—1st. prem., $10, J. M. Jordan, St. Louis; 2nd. prem. $5, Wm. Schray, St. Louis.

Pair Mantle or Flat Bouquets. — 1st. prem. $10, Wm. Schray, St. Louis; 2nd. prem. $5, J. M. Jordan, St. Louis.

Floral Design, (Dried Flowers). — 1st. prem. $10, L. C. Waite, St. Louis; 2nd. prem. $5, Mrs. N. B. Lewis, St. Louis.

Vase, Stand or Basket of Flowers.—1st. prem. $10, Mrs. E. H. Lindsay, St. Louis; 2nd. prem. $5, Mrs. D. P. Hall.

Large Table Bouquet.—1st. prem. $10, David Tish, St. Louis.

Pair Mantel Bouquets. — 1st. prem. $10, David Tish, St. Louis.

Largest and Best Collection Ornamental Foliage. — By Michel Bros. & Kern, 1st. prem. $30, David Tish, St. Louis.

CLASS F.

FINE ARTS DEPARTMENT.

E. C. LACKLAND, SUPERINTENDENT.

This department has always been the popular favorite with the multitudes visiting our annual Fair. The principles of taste lie at the very foundation of mental qualities. The rudest as well as the most cultivated minds, have a more or less perfect sense of the beautiful, and are always seeking to gratify that sense. In some, the elements of good taste are very imperfectly developed, but no one was ever so thoroughly debased as not to find beauty in a rainbow or the stars. Hence the rude and uncultivated will rush to a picture gallery with almost as much eagerness, if not enjoyment, as the crowds of amateurs and *dilettante*. But the multitudes who attend the Fair, possess a certain amount of culture, and the roughest and rudest specimen that could be found, still knows a "hawk from a handsaw," and a good picture from a miserable daub.

Class "F," under which is combined everything that is related either immediately or remotely to the fine arts, occupies its quarters of last year in the old Amphitheater. The display in this department, from the nature of the articles contributed, and their peculiar beauty, has possessed in previous years, rare attractions. It has claimed the first attention of the entering visitors, and detained them the longest. The immense crowds that have surged hither and thither through the other buildings, have moved sluggishy through the narrow corridors, charmed by its delicate sights and sounds that have fascination for the eye and ear. Its walls have been hung with every variety of paintings by the best of our local and many of the first artists of the country, while music from organs and pianos has added its captivating influences. The visitor this year will notice no diminution from the attractiveness of former exhibitions, save in one or two unimportant details, and these are hardly apparent, so carefully have articles been arranged by the superintendent and his assistant, Mr. A. O. Engelmann, with a view to effect and general harmony. The entries in several of the classes are more numerous than those of last year, and a host of novelties are apparent.

The outer wall of the building is covered as usual with paintings and pictures in general. It is here alone that any deficiency can be observed. The art exhibition at the Mercantile Library Hall has drawn off several of the *chef d'oeuvre* that have apppeared for several years in succession, and has prevented so complete a collection of the works of our amateurs and connoisseurs as would otherwise have been made.

PRINCIPAL OBJECTS OF INTEREST.

Among the principal paintings, and those which will repay the closest study, are two of the works of the celebrated Wiman—one in oil, a drove of Buffaloes on the Platte River, and the other a small water colored sketch of a mounted Indian

Chief. There are two also by our distinguished home artist, J. R. Meeker—the first a marine view of rare beauty, and the other a delicate bit of landscape, exhibiting the exuberant foliage and brilliant coloring of a Southern Autumnal scene. Mr. Stuart, the portrait painter of this city, contributes a number of heads, and Mr. Wm. M. Chase several tantalizingly real looking fruit pieces. Miss Josie McKellop, whose work, considering her years, is something wonderful, both for its diversity and its fidelity to nature, in whatever department it is exhibited, has a striking animal portrait—a terrier sleeping in a draped chair—and two companion fruit studies. Schultz, a St. Louis artist, exhibits a number of paintings, chief of which are a peculiar composition, "The Children at Sunrise," "The Newsboy," and a clever landscape, called, we believe, a "Scene in the Rocky Mountains." There are two landscapes by Mr. C. W. Knapp of Philadelphia, which are worth more than a passing notice. Several miniature studies by Brandt, of rare excellence; a Marine view of the coast of Maine, by Mr. C. S. Chase, Jr.; a fruit study by Hoefle; a summer evening scene by George Duness, and the landscape, "A morning in the Tropics," by a lad fifteen years of age, which has other claims to attention than the precocity of its author, and many others, complete the list. Those which have been particularized are not alone those which deserve especial mention, but those which will in all probability first arrest the eye of the visitor. Several of decided merit are modestly dispersed among those above enumerated.

The collection of photographs is unusually good, and vastly more numerous than at any previous exhibition. Already the number of specimens has completely filled the space allotted to this department of the fine art exhibition, and is encroaching upon the walls of the adjacent Class. This display is all the more gratifying when it is remembered that no premiums are offered in this department. The photographers represented are all St. Louisians, and are as follows; Fitzgibbon, Scholten, Crammer, Gross & Co., Boehl & Koenig, F. Hammer and R. Benecke. Each of them exhibits excellent work and in their specialties, they have very few superiors in the country. Scholten's very extensive group embraces a number of excellent specimens of art in the way of sepias, cameos, rose-tints, which have the rich, gray brown color of India-Ink, and Rembrandts in silk finish, all novelties in their way. The collection justifies the doubtful assertion that doctors can agree, for side by side, and apparently in the most pacific relations, are the photographs of a large number of the leading physicians of the city, of several different schools. The list of ladies and gentlemen in Scholten's gallery, embraces Captain Eads, Jr., Mr. and Mrs. Tausig, F. Whittaker, James Harrison, J. J. Roe, E. Jaccard, all in life size crayons, G. O. Kalb, G. Shryock, J. F. Madison, Chief McDonough, and others.

The collection of musical instruments does not differ materially in size from that of last year. Balmer and Weber exhibit a number of elegantly encased Wood's parlor organs, and Steck & Co's & Miller & Co's square and grand pianos. The St. Louis piano manufacturing company, have in display their Burdett organs and a number of bell-treble, upright, grand and square pianos. Merkle & Mersman exhibit an improved bell-treble piano of rare sweetness of tone.

There are but three billiard tables in the department—two exhibited by J. M. Brunswick & Bro., and one by Julius Balke.

More in the way of art proper are several busts in marble, plaster-paris and bronze, while several sacred figures carved in wood give adornment to the department. Two or three of these only are worthy of special mention, and several, it is evident, are the work of tyros.

The entries in crayon and chalk drawing are not very numerous, but there are some specimens of careful and excellent work by amateurs. Among the best are two drawings of the Venus form, after the ancient sculptured models. That by D. Deamant is the softest in tone and the best. The other is also good and is the

work of Louis Schultz. A small drawing by Otto Newstadt is very clearly and correctly done, but a triffle scratchy.

Among the other parties, who exhibit drawings under this head are: Fred Hoefel, Miss G. Gest, Madame Noa, Mrs. Dr. E. E. Coleman, W. T. Keller, Miss Sarah E. Williams, D. Dearmant and Louis Schultz.

Drawings in pastel. There are only two entries, by Eugene Gerault, of St. Louis, one of them a male and the other a female head. The latter is the best, and is, we believe, the picture that took the premium last year. The subject is a lady's face, maternal and lovely, old-fashioned in the close fitting cap and the arrangement of the hair.

In colored crayon drawing there are six entries: one by C. Firemin, one by Madame Noa, one by Mrs. L. B. Graw, one by Miss Snow, one by E. R. Mason and the sixth by E. De Laureal, all of this city. The first premium was awarded to a drawing by Madame Noa, and the second to a drawing by E. De Laureal of Carondelet.

The subject of the first is the head of a Hebe-like maiden, with hair unbound. It is fairly executed, but with a lack of freedom.

In pencil figures there are fourteen or fifteen entries, some well done, but none of them of particular interest. Among the exhibitors are: C. Krayrr, Henry Damen, Otto Newstadt, Miss H. Douglass, C. Firmin, Fred. R. Wilson, Miss Fanny Lapere, Miss Lucy Blenett, Mad. D'Episey, and others, all of St. Louis.

Lettering on glass in gold—There are five entries. T. Meisberger, of St. Louis, has a very tastefully finished sign frame, Jacob Greenwood & Co., have two entries, and the Union Sign Works, two entries. The latter's specimens received the blue ribbon.

Mr. R. S. Scrottrom exhibits a number of adjustable mirrors which by easy adjustment give side, back and front views —excellent articles we have no doubt for young ladies of fashion. The number of female visitors who accepted the invitation to step between the glasses was something astonishing.

There are only two entries of statuettes in marble, clay or plaster. One by J. Macauley, of St. Louis, and the other, one of Roger's charming works, exhibited by Pettes & Leathe. The subject of the latter is Rip Van Winkle at home, and the details are finished with so much delicacy and truth that the group has a most animated aspect; the character of the quaint old Dutchman being graphically worked in the face of the central figure. The other entry represents that famous game of euchre in which the "Heathen Chinee" participated and with such remarkable results, that Bret Harte has done it into song with great success. The scene, however, in the statuette is before the denouement, caused by "Ah Sin" playing "A game he did not understand."

Mrs. M. W. Frisbie has a large and handsome case containing specimens of "decalcomanie and diaphanie work." Most of the subjects are small, brilliantly tinted little farms and landscapes, worked on porcelain lamp shades, china cups, or in small oval picture frames. There is a good deal of taste and skill exhibited in the specimens, and the case attracts a great deal of notice from ladies. This kind of work is becoming popular as a graceful accomplishment for ladies and others, and is certainly useful as well as ornamental.

Among the entries of basso-relievos, is one by Perrin, in which the face of the late Nathaniel Paschall is depicted, and the artist has succeeded in procuring a true and forcible likeness, retaining particularly the strong lines and incisive, self-reliant expression peculiar to the original.

There are three busts on the southern table by the same artist. The subjects are Gen. Blair, G. W. Dryer and Mr. Conant.

The specimens of carving in wood number some eight or ten. Among the exhibitors are Hellfenstetter & Goerbeck, Otto Newstadt, Wm. Petterson, A. Pries & Co., Stopplekemp & Hohman, Fred. Esselbon, J. H. Crane and others. In one or two instances, miniature houses are entered under this head, bnt where the carving comes in does not plainly appear.

A Marine View by Hart. This is in the collection of Mr. Coale, and was exhibited last year. It is a charming little picture, evenly balanced in color, but somewhat blurry in the perspective.

A landscape by A. D. Shattuck and in the same collection. The subject is a level stretch of swampy land, with trees in background, a sedgy stream and cattle also forming a feature. The coloring is subdued, but exquisitely natural, and shows slow and careful work. It is a very pleasing picture.

The only entries made in chromo lithography are by Geo. M. Harding, as agent for Duvall & Hunter of Philadelphia. Some eight or ten pictures are exhibited of different sizes and some of them of excellent character, but nearly all of them have a vividness of coloring, and a sharpness of contrast in tints that render them untrue to nature. The great majority of people, however, do not care very much for this merit; and chromos are so smoothly finished, and are so bright and handsome with their brilliant hues, that they daily become more popular and must eventually interfere very considerably with the profits of professional artists.

AWARDS IN CLASS F.

Grand Pianos.—1st prem. dpl. and $50, St. Louis Piano Mfg. Co.

Square Pianos, 9 entries.—1st prem., dpl. and $50, Merkel & Mersman, St. Louis; 2nd prem. $20, St. Louis Piano Mfg. Co.

Upright Pianos, (3 entries).—1st prem., dpl. and $10, Merkel & Mersman, St. Louis.

Parlor Organ, (4 entries).—1st prem., dpl. and $20, Burdett, by St. Louis Piano Mfg. Co.

Church Organ.—1st prem. dpl. and $20, Burdett, St. Louis Piano Mfg. Co.

Violins.—1st prem. medal, Jacob Schneel, St. Louis.

Band Instruments.—1st prem. medal, Boston Mu. In. Mfg. Co.

Flutes.—1st prem. medal, May, Goldsmith & Co., St. Louis.

Guitars.—1st prem. medal, May, Goldsmith & Co., St. Louis.

Billiard Table.—1st prem. dpl. and $10, J. M. Brunswick, St. Louis.

Combined Billiard and Library Table.—Hon. mention, J. M. Brunswick, St. Louis.

Bust in Marble, Clay or Plaster.—1st prem. dpl. and $20, Muldoon, Doyle & Co., St. Louis.

Bust in Marble, Clay or Plaster, made in Missouri.—1st prem. dpl. and $20, P. G. Peran, St. Louis; 2nd prem. dpl. and $10, J. A. McCaulley, St. Louis.

Statue in Wood.—1st prem., dpl. and $10, M. Schniederhan, St. Louis.

Statuette in Marble, Clay or Plaster.—1st prem., dpl. and $20, John Rogers, St. Louis; 2nd prem. $10, J. A. McCaulley, St. Louis.

Specimen Orn. Plaster Work.—1st prem. dpl. and $10, Jno. Maygar, St. Louis.

Alto Relievo, (3 entries).—1st prem. dpl. and $10, J. A. McCaulley, St. Louis; 2nd prem., dpl. and $5, P. G. Peran, St. Louis.

Basso Relievo, (3 entries).—1st prem. dpl. and $10, P. G. Peran, St. Louis; 2nd prem., $5, P. G. Peran, St. Louis.

Basso Relievo, cut in Marble, &c.—1st prem. dpl. and $25, P. G. Peran, St. Louis; 2nd prem. $10, P. G. Peran, St. Louis.

Carving in Wood, (8 entries).—1st prem. dpl. and $10, Helfensteller & Goerlich, St. Louis; 2nd prem., $5, H. Pries & Co., St. Louis.

Animals painted in Oil, (13 entries).—1st prem. dpl. and $25, D. Diamant, St. Louis; 2nd prem. $10, Josephine McKellops, St. Louis.

Painting of Fruit, (4 entries).—1st prem., dpl. and $20, Josephine McKellops, St. Louis; 2nd prem. $10, Will. M. Chase, St. Louis.

Landscape, (15 entries).—1st prem. dpl. and $50, Geo. M. Harding, St. Louis; 2nd prem. $20, Geo. M. Harding, St. Louis.

Marine Picture, (7 entries).—1st prem. dpl. and $30, H. S. Chase, jr., St. Louis; 2nd prem. $15, Geo. M. Harding, St. Louis.

Head, Cabinet Size, (2 entries.)—1st prem. dpl. and $20, Will M. Chase, St. Louis.

Head, Life Size, (12 entries).—1st prem. dpl. and $20, Louis Schultze, St. Louis; 2nd prem., $10, E. Boyle, St. Louis.

Composition, (9 entries).—1st prem., dpl. and $50, Louis Schultz, St. Louis; 2nd prem. $20, C. Weimer, by S. A. Coale, St. Louis.

Composition by a Boy under 15 years.—1st prem. dpl. and $25, Herman Rasher, St. Louis; 2nd prem. dpl. and $10, Robert Krein, St. Louis.

Best Collection Oil Paintings, by Dealer.—1st prem. $250, Geo. M. Hardding, St. Louis.

Best Collection Oil Painting by Amateur.—1st prem. $250, Samuel A. Coale, St. Louis.

Animal Painting in Water Colors.—1st prem., dpl. and $10, W. A. Mossberger, St. Louis.

Marine Painting in Water Colors.—1st prem. dpl. and $10, H. L. Andrews, London, by S. A. Coale, St. Louis; 2nd prem. $5, C. Firmin, St. Louis.

Fruit Painting in Water Colors.—1st prem. dpl. and $10, G. M. Harding, St. Louis; 2nd prem. $5, Ferdinand Hoefel, St. Louis.

Flowers Painting in Water Colors.—1st prem., dpl. and $10, Ellen Robbins, Boston, by S. A. Coale, jr., St. Louis; 2nd prem., dpl. and $5, Julia Niedergerber, St. Louis.

Landscape (Water Color).—1st prem. dpl. and $10, Jas. Hamilton, Philadelphia by S. A Coale, St. Louis; 2nd. prem. $5, Louis Schultz, by Dr. W. H. Evans, St. Louis.

Head (Cabinet Size.)—1st prem. dpl. and $10, Louis Schultz.

Composition, (9 entries).—1st prem. dpl. and $20, Wm. T. Keller, St. Louis; 2nd prem. $10, T. F. Dibden, London, by S. A. Coale, St. Louis.

Composition by Boy or Girl under Fifteen.—1st prem. dpl. and $15, Hermann Raseher, St. Louis; 2nd prem. $10, Robert Krein, St. Louis.

Steel Engraving.—1st. prem. dpl., and $5, Geo. M. Harding, St. Louis; 2nd prem. silver medal, J. Murphy, London, by C. T. Hogan, St. Louis.

Chromo-Lythography.—1st prem. dpl. and $10, Duvall & Hunter, Philadelphia 2nd prem. silver medal, Geo. M. Harding, St. Louis.

Lithography (In Colors).—1st prem. dpl. and $10, Duvall & Hunter, Philadelphia.

Drawing in Stipple Crayon.—1st prem. dpl., and $5, Miss Georgia Gill, Alton Ill.

Crayon, Stump, 8 entries.—1st prem. dpl., and $5, Geo. P. Rock, Berlin, by Mrs. A. Zomberlein, St. Louis; 2nd prem. silver medal, Miss Josephine McKellops, St. Louis.

Crayon and Chalk, (14 entries).—1st prem. dpl., and $10, Louis Schultze, St. Louis; 2nd prem. silver medal, Cæsar Firmin, St. Louis.

Pastile.—1st. prem. dpl., and $5, Madame Noa, St. Louis.

Colored Crayon, (7 entries).—1st prem. dpl., and $10, Madame Noa, St. Louis; 2nd prem. dpl., silver medal, E. De Lareal, Carondelet.

Pencil Figures, (13 entries).—1st prem. dpl., and $5, Ferdinand Hoefel, St. Louis; 2nd prem. $3, Miss Lucy Blewett, St. Louis.

Pencil Landscape, (15 entries).—1st prem. dpl. and $5, Thos. Collet, St. Louis; 2nd prem. $3, Miss Alice Raymond Lebanon, Ill.

Pencil, Fruit and Flowers.—1st prem. dpl. and $5, Ferdinand Hoefel, St. Louis

Drawing With Pen, (15 entries).—1st prem. dpl., and $10, Cæsar Firmin, St. Louis; 2nd prem. dpl., and $5, A. Frederick, St. Louis.

Architectural Drawing.—1st prem. dpl. and $10, A. Druding, St. Louis; 2nd prem. $5, J. B. Legg & Co., St. Louis.

Machinery Drawing.—1st prem. dpl. and $10, Jno. Ord, St. Louis.

Penmanship, (19 entries).—1st prem. dpl., and $10, A. Frederick; 2nd prem. $5, D. L. Musselman, Quincy, Ill.

Penmanship by Boy or Girl, at School, (13 entries).—1st prem. dpl. and $5, Peter Muehlhofer, St. Louis; 2nd prem. $3, Wm. Young, St. Louis.

Penmanship (Ornamental).—1st prem. dpl., F. W. Wiesehahn, St. Louis.

Penmanship (Ornamental).—1st prem. dpl., F. W. Wiesehahn, St. Louis.

Lettering on Glass with Gold.—1st prem. dpl. and $10, Union Sign Works, St. Louis.

Crayon, Head, Life Size, by Boy or Girl under Twenty Years.——1st prem. dpl., and $20, H. Damen, St. Louis; 2nd prem. $10, J. Backhof, St. Louis.

Flowers and Fruit on Glass.—1st prem. dpl. and $10, Ferdinand Hoefel, St. Louis; 2nd prem. $5, Mrs. M. R. Flint, Shipman, Ill.

Collection Gilt Frames.—1st prem. dpl. and $10, G. M. Harding, St. Louis.

Miniature on Ivory.—1st prem. dpl. and $10, Luiqua, by S. A. Coale, jr., St. Louis.

Miniature in Ivory.—1st prem. $10, Linqua, by S. A. Coale, jr. St. Louis.

Mirrors.—1st prem. $10, A. Pries & Co., St. Louis.

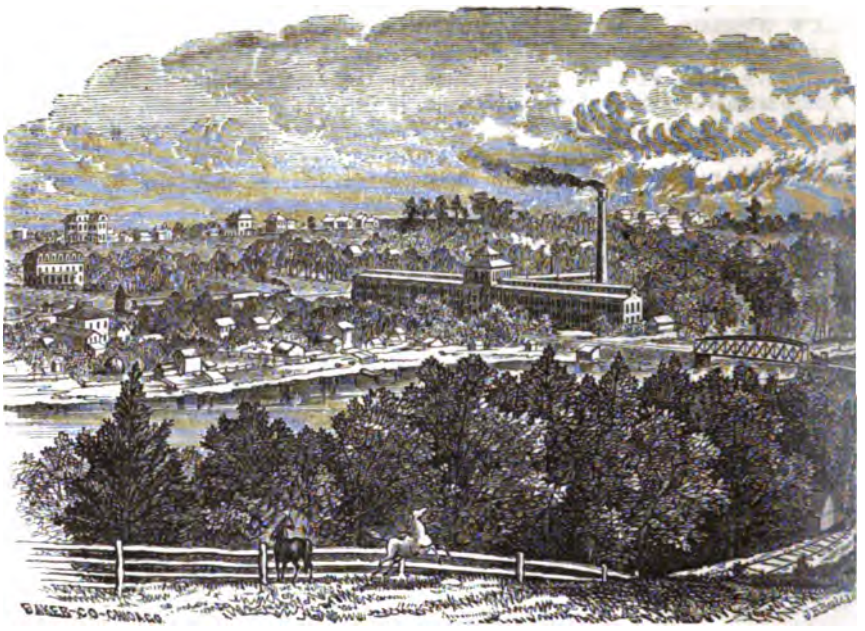
Decalcomania.—Hon. mention, Mrs. M. W. Frisbie St. Louis.

Elevations of Dwellings.—1st prem. dpl., J B. Legg & Co., St. Louis.

Elevations of Stores.—1st. prem. dpl.. J. B. Legg & Co., St. Louis.

Design for Cottage.—1st prem. dpl., J. B. Legg & Co., St. Louis.

Design for Tenement House.—1st prem. dpl., J. B. Legg & Co., St. Louis.



NATIONAL WATCH COMPANY, ELGIN, ILL.

NATIONAL WATCH COMPANY, ELGIN, ILLINOIS.

The achievements of the active spirit of American ingenuity have, in a great measure, counterbalanced the advantage derived by European manufacturers from the low rates of wages almost everywhere on the other side of the Atlantic. In some of the over-peopled countries of the eastern continent, the great problem amongst rulers is to find something for the multitude to do, to keep them out of mischief and out of the alms-house at the same time. There is a certain amount of labor to be performed, and this must be divided amongst as many hands as possible. Hungry mouths make disloyal hearts and rebellious hands, and so the mouths must all be fed and the hands must be kept busy, if they only earn a scanty supply of the coarsest food.

The Israelites were ground down to the dust by the hard hand of the Egyptian tyrant, and were compelled to find the straw to put in their bricks. This was to prevent them from becoming dangerous to their masters. Millions of people are compelled to "make brick without straw," even down to this day. In America, on the contrary, we have so much to do, and so few to do it, that the brain must work actively to assist the overtasked hand. A single day in the Patent Office at Washington will show even the casual observer how much mind has done to increase the effective power of muscle.

Yankee ingenuity did not exhaust itself upon the coarser works of art, the common implements and machines to be used by the mechanic, the farmer, the gardener or the housewife; but invented rare and beautiful pieces of mechanism, in which use and ornament were happily combined. American clocks and watches fully illustrate this last remark.

The first effort in this direction was to make a cheap, but reliable clock. The wheels of the Yankee clock were sawed or cut by machinery, from some kind of hard wood, and the time-keeping machine, with its appertenances and pictorial adornments, was made for one or two dollars at the factory, and sold to the backwoods settler for a cow, a horse or ten acres of land, just as seemed most convenient to the purchaser. Those ancient clock pedlers, who drove a brisk trade through the country, and were immortalized by Jack Downing; alas, alas, when shall we see their like again?

Gradually the Yankee clock advanced in its material, from wood to metal, assumed artistic shapes, gained a world-wide popularity, and was shipped by cargoes into nearly every country in Christendom. Even the mechanicians of Switzerland and the Black Forest, who worked only for bread, could not compete with the automatic, clock-making machinery that had originated in some Yankee's prolific brain.

Within the last quarter of a century the same inquisitive and indomitable spirit, has taken a bold step forward and invented machines to make that most wonderful, beautiful and useful contrivance —A PERFECT WATCH. A number of establishments are in operation in different parts of the United States, turning out many thousand watches every year.

The National Watch Company, of Elgin, Ill., from which we give some illustrations on the opposite page, ranks with the very best establishments of the kind in the world. This company had a little nook in one of the Fair buildings, and a number of skilled female employes were constantly engaged in making the different parts of a watch, while a foreman put these parts into position; and the wondering crowd gazed with open-mouthed admiration, as they saw an assemblage of steel and brass wheels, springs, screws, plates and pins adjusted together, and heard the "tick, tick," come like spirit rapping from what was only a few moments before, dull and dead metal. They not only received the highest awards of the Fair Association, but the thanks of many thousands who saw, for the first and last time, in their lives, how a watch is made.

The National Watch Company is a Western enterprise, which, from the peculiar excellence of its work, strongly commends itself to Western good will and world-wide patronage.

CLASS 6.

TEXTILE FABRICS AND MATERIALS.

CHAS. SPECK, SUPERINTENDENT.

This department shows wonderfully well, not only the growth of the St. Louis Fair, but the progress of the world in the useful arts. When the "gentle savage" has satisfied the cravings of hunger, his next desire is to seek some covering for the body. When sin begat shame, mother Eve at once turned mantuamaker, and with no better facilities than bark fibre for thread, a thorn for a needle and fig leaves for material, soon improvised a garment that might answer for a warm climate, but would offer little comfort or protection in a northern winter. It would be as interesting as curious, if one had both time and ability to trace the history of cloth making from that period to this. But all you can do here, is simply to wonder at and admire the achievements of human ingenuity in this field of art. Such miraculous productions of the loom and the needle—such broadcloth, silk, satin, lace, carpets, curtains—such a rare and varied collection of useful and beautiful fabrics as would have astonished the ancient makers of "purple and fine linen," and such rainbow hues as would put to shame the world renowned "Tyrian dyes." Here you find them in a thousand different forms, remarkable either for their beauty or utility. The scene, looking downward from the head of the space devoted to textile fabrics, is beautiful and animating in the extreme, and the mechanical wonders of the exhibition are only excelled by the natural charms of the thousand interested spectators.

SEWING MACHINES.

The center of the building is taken up with booths or stalls occupied by the agencies of the different sewing machine companies. Many of them are tastefully decorated with lace curtains and embroidery deftly arranged by female hands. From within comes at all hours the whirr of the wheels and the sharp click of the needles. About them are gathered all day crowds of the curious. The firms represented are, in the order of their location, the Singer, the Weed, the Howe, the Davis, the American Button Hole Worker and Overseamer, the Keystone, the Florence, the Wilson, the Grover & Baker, the Improved Empire, the Finkle & Lyon, the Wilcox & Gibbs, the Wheeler & Wilson, and the Home.

NEEDLE WORK.

On either side, arranged on shelves against the walls, are specimens of almost every kind of needle-work and feminine handicraft. There are embroideries of the most delicate description, from those which complete the details of the mystery of a full suit of ladies' garments, to the tiniest sort of a kerchief, and crochet work, and flowers, and loves of bonnets, and laces, and silks of the richest and costliest description. There is evêrything to captivate a woman's eye and bewilder a man's brain. Among the more delicate articles are warm, fleecy blankets, specimen suits of gentlemen's clothing, both for outer and underwear.

PICTURES IN WORSTED.

Over against one of the walls is a formidable array of pictures in worsted work, and in all the devices that nimble fingers and fertile imaginations are capable of. The subjects are original—decidedly original, some of them. They are historical and religious and comic, very comic occasionally. Not a few are marvels of good work, however, and rare judgment, and will repay close attention. One especially gives evidence of the finest taste and the cleverest kind of skill. It is a wreath made of feathers, but so happily combined as to give a wonderfully natural appearance.

ARRANGEMENT AND CLASSIFICATION.

The admirable arrangement and grouping of the great number of articles in this department, are due to the good taste and energy of the superintendent and his efficient assistants. This kind of classification adds greatly to the pleasure and satisfaction of visitors. An effort for such a result as this is made in all the departments of the Fair, but in some with much more success than in others.

WOOLEN GOODS.

For some reason not fully explained, the exhibition of the woolen manufacturers of the south and west was a partial failure. Arrangements had been made at their last meeting to have a grand exhibition of their goods at the St. Louis Fair. The President, Mr. Barret, took special pains to have abundance of space set apart and proper fixtures arranged for the display of goods,—the Secretary wrote to hundreds of manufacturers and eighty-five sent in applications for space to exhibit their goods. But when the Fair came, neither the manufacturers nor the goods were present, with the exception of a very small number. Some said the goods were delayed in transit, and different reasons were given by others. So it was, the goods did not come, and the fact was a sense of disappointment to some, though it did no perceptible damage to the Fair.

MANUFACTORIES REPRESENTED.

Amongst the establishments represented, Field Brother of the Missouri Woolen Mills company, St. Charles, show six styles of blankets and the same number of carriage-rugs, manufactured from wool grown in Missouri; also between thirty and forty pieces of cassimere, each different and all of excellent quality. The latter may be specially said of the goods with a Melton finish.

The Tiffin woolen mills, of Tiffin Ohio, represented to be the largest in the State, have an extensive and varied assortment of all-wool tweeds, fancy check and plaid flannels, honey-comb stockings, plaid cloakings, &c. Some of the goods are of very fine texture and of new patterns.

Joseph Schwab has on exhibition specimens of sheetings from the Louisiana Cotton Factory, (La.) and factories at Columbus, Georgia and Baton Rouge, La., also samples of yarns from the Lane Cotton mills, Jefferson City.

The Laclede mills, St. Louis, enter remarkably fine samples of cotton batting, and the Home Cotton mills, St. Louis, have fine samples of cotton yarns.

J. B. Carson, Brother & Co., exhibit wool as taken at shearing, and after it has passed through the cleaning process. They also enter specimens of cotton sheetings from different factories.

The Louisville Woolen Mills are amongst the competitors.

Blake & Co., Racine, Wisconsin, display woolen shawls, flannels and ladies' cloth. They are the only exhibitors in this department from that State.

BAGGING.

An interesting feature in this department is the display of bagging by Bemis, Brown & Co., St. Louis, who have sent to the Fair bales of jute and Dundee bags, grain and plain sacks and gunny bags, the latter as just received from the East Indies, and afterwards re-sewed.

Minneapolis Mills furnish a contribution to this class.

ARTISTIC DISPLAY.

Wm. Barr & Co. have a show case, ten or twelve feet in height, and containing a display of goods much admired by the ladies. The contents of the case are stated to be worth $25,000, and comprise, amongst other objects of interest, an Indian shawl valued at $3,000; on which the labor of two families, of sixteen persons, was expended during twelve years: a quantity of raw silk, as taken from the cocoon, is also exhibited by Barr & Co.

FANCIFUL AND ORNAMENTAL.

A very pretty specimen of ornamental work is exhibited by Mrs. M. C. Ball, of St. Louis, and is made of leather, representing a delicate piece of carving. Exquisite specimens of artificial wax flowers are exhibited by Miss Z. B. Cichnower, Mrs. M. W. Frishey, Mrs J. E. Anable, Mrs. Wallace and others, and a similar specimen of wax fruit is shown by Mrs. Girard, St. Louis.

Mrs. Barbara Kellerman, of Chicago, attends at several cases of her ornaments made from immortelles, colored after being cut. She exhibits a variety of mosses, bouquets, wreaths, hanging baskets and harps. It is an interesting assortment.

FAN ATTACHMENT.

The latest addition to the sewing machine department is a model of Thompson's fan attachment for that household necessity. The apparatus is intended to be worked by the treadle with which sewing machines are operated.

MISCELLANEOUS.

An infant affghan for which Mrs. Chas. Kellogg of St. Louis, obtained the first premium, will repay a close inspection. It is of wool, knit, and is a beauty.

Mrs. E. J. McKims, of St. Louis, exhibits a large collection of patterns for ladies' dresses.

In undershirts there are several dozens from the Dixon Knitting Mills, Dixon, Ill.

AWARDS IN CLASS G.

Fleece Merino Wool.—1st prem. dpl., J. B. Carson.

Jeans, 10 yards.—1st prem. dpl., Louisville Woolen Mills, by J. B. Carson, St. Louis.

Rag Carpet.—1st prem. dpl. Miss A. C. Farmer, St. Clair Co., Ill.

White Flannels.—1st prem. dpl. and $10, Tiffin, Woolen mills, Tiffin, O.

Plaid Flannels.—1st prem. dpl. and $10, Tiffin Woolen Mills, Tiffin O.

Gray Flannels.—1st prem. dpl. and $10, Wm. Barr & Co., St. Louis,

Brown Sheetings.—1st prem. dpl. and $10, Eagle Cotton Mills, Pittsburgh.

Brown Shirting.—1st prem. dpl. and $5, Columbia Manufacturing Co., Ga.

Display Woolen Shawls.—1st prem. dpl. and $10, Waukesha Manufacturing Co., Wis.

Coverlets, Wool or Cotton.—1st prem. dpl. and $5, Mrs. Dr. A. B. Barbu, St. Louis Co.

Blankets, Woolen.—1st prem. dpl. and $10, G. H. Tyler, Minneapolis, Minn.

Cotton Warps.—1st prem. dpl. and $5, Brown, Merriatt & Co., St. Louis.

Cotton Batting.—1st prem. dpl. and $10, Brown, Merriatt & Co., St. Louis.

Carpet Warps.—1st prem. dpl. and $5, Brown, Merriatt, & Co., St. Louis.

Mittens.—1st prem. dpl. and $5, Miss C. B. Hobbs, Paducah, Ky.

Tweed.—1st prem. dpl. and $5, Tiffin Woolen Mills, Tiffin, O.

Woolen Yarn.—1st prem. dpl. and $10, Tiffin Woolen Mills, Tiffin, O.

Cotton Yarn.—1st prem. dpl. and $5, Merriatt & Co., St. Louis.

Cotton Seamless Bags.—1st prem. dpl. and $10, D. Morrison, Minneapolis, Minn.

Oil Cloth.—1st prem. dpl. and $10, Stephen Lisby, St. Louis.

Counterpanes, domestic woven, 5 entries.—1st prem. dpl. and $5, Mrs. E. R. Moffatt, Iowa.

Counterpanes, Crochet, (10 entries).—1st prem. $8, Mrs. Behnke, St. Louis; 2nd prem. and $4, Miss Minnie Mullins, St. Louis.

Crochet Work, (84 entries).—1st prem. $10, Mrs. Thos. S. Nelsod, St. Louis; 2nd prem. $5, Mrs. Sarah Henglemeyer, Belleville, Ill.

White Muslin Quilts, (8 entries).—1st prem. $6, Miss E. Fitzsimmons, Jacksonville, Ill.; 2nd prem. $3, Miss R. Christy, St. Louis.

Patchwork Quilts, (21 entries).—1st prem. $10, Miss Mary Braddock, St. Louis; 2nd prem. $5, Miss Hester Rosebrough, St. Louis.

Quilts, Calico Patchwork, (88 entries).—1st prem. $6, Mrs. E. R. Moffatt, St. Louis; 2nd prem. $3, Mary Bristols, St. Louis.

Quilts, Silk, (16 entries).—1st prem. $15, Mrs. Bart. Able, St. Louis; 2nd prem. $7, Mrs. R. F. Saas, St. Louis.

Quilts, Worsted, (24 entries).—1st prem. $10, A. F. Dudley, Mexico, Mo.; 2nd prem. $5, A. F. Dudley, Mexico, Mo.

Comfort, Silk.—1st prem. $5, Mrs. S. H. Dorriss, St. Louis.

Plain Sewing, (12 entries).—1st prem. $6, Mrs. E. L. Gilham, St. Louis; 2nd prem., $3 Josselyn, St. Louis.

Sewing by Girl under 10 years.—1st prem. $6, Rose Kuchle, St. Joseph, Mo.; 2nd prem. $3, Mary Drew, St. Louis.

Shirts, fine, unwashed.—1st prem. $15, Mrs. Wm. Payne, Palmyra, Mo.; 2nd prem. $10, Mrs. A. L. Gilham, St. Louis.

Shirts, coarse, unwashed.—1st prem. $5, Mrs. C. B. Hobbs, Paducah, Ky.; 2nd prem. $3, Mrs. Alice Harrison, Fulton, Mo.

Shirts, made on machine.—1st prem. $5, Mrs. C. B. Hobbs, Paducah, Ky.; 2nd prem. $3, Mrs. Phenice Coffman, St. Louis.

Darning, (8 entries).—1st prem. $4, Miss Katie P. Degge, St. Louis.

Netting, (5 entries).—1st prem. $5, Mrs. M. L. Buckner, St. Louis.

Knitting, (8 entries).—1st prem. $5, Miss Rielly, St. Louis.

Stockings, (9 entries).—1st prem. $5, Mrs. W. Ring, St. Louis.

Cotton Stockings, (15 entries).—1st prem. $5, Mrs. C. S. Steele, St. Louis.

Linen Stockings, (6 entries).—1st prem. $5, Mrs. L. A. Woodburn, St. Louis.

Stockings by Girl under 12 years, (4 entries).—1st prem. $6, Rose Kuchle, St. Joseph, Mo.; 2nd prem. $3, Sophy Huhn, St. Louis.

Woolen Socks, (10 entries).—1st prem. $5, Mrs. C. B. Hobbs, Paducah, Ky.

Cotton Socks, (9 entries).—1st prem. $5, Mrs. E. F. Rea, St. Louis Co.

Socks by girl under 12 years, (3 entries).—1st prem. $6, Rose Kuchle, St. Joseph, Mo.

Children's Fancy Sacks, (9 entries).—1st prem. $3, Miss Reilly, St. Louis.

Knit Counterpanes, 12 entries.—1st. prem. $5, Mrs. C. B. Weissenfel, St. Louis.

Knit Shirts.—1st prem. $5, Miss Sarah Lanham, St. Louis.

Foot Mats, (7 entries).—1st. prem. $3, Mrs. S. A. Chipley, St. Louis.

Knit Counterpane, Premium by Cheever & Burchard.—1st. prem. $10, butter dish, Mrs. C. B. Weissenfel.

Silk Quilt, (St. Louis Make).—1st. prem., $10.

Silk Tatting.—1st. prem., $6, Miss E. Converse, Quincy Ill.; 2nd. prem. $3, Miss Julia Nieduguhu, St. Louis.

Cotton Tatting, (15 entries).—1st. prem. $5, Miss Naiad Cuseip, St. Charles; 2nd. prem. $3, Miss Julia Nieduguhu, St. Louis.

Tidy, (Woolen or Cotton, 52 Entries).—1st. prem. $5, Miss Annie Gordon, St. Louis., 2nd. prem. $3, Miss Fannie Bradly, St. Louis.

Hem Stitching, (5 entries).—1st. prem. $5, Miss Sarah Sanborn, St. Louis; 2nd. prem. $3, Miss E. J. Ishell, St. Louis.

Braiding, (8 entries).—1st. prem. $3, Miss Mary Long.

Pin Cushions, (5 entries).—1st. prem. $3, Miss Fannie Habbard, St. Louis.

Sofa Cushions, (9 entries).—1st. prem. $6, Miss Anna Kreft, St. Louis; 2nd. prem. $3, Mrs. C. J. Tilley, St. Louis.

Toilet Cushions, (12 entris).—1st. prem. $5, Mrs. M. L. Russell, St. Louis; 2nd. prem. $2, Mrs. S. W. Barker, St. Louis.

Fancy Cushion, (5 Entries).—1st. prem. $6, Mrs. C. J. Filley; 2nd. prem. $3, Mrs. Wm. Blow, Carondelet.

Lamp Mat.—1st. prem. $3, Miss Martin Colburn, St. Louis.

Work Basket.—1st. prem. $6, Miss Lena Kehet, St. Louis.

Infant's Basket.—1st, prem. $6, Mrs. S. S. Curtis, St. Louis.

Filley Work.—1st. prem. $5, Mrs. Anthu, St. Louis.

Fluting—1st. prem. $5, Mrs. Keller, St. Louis.

Charm String, (10 entries.)—1st. prem. $5, Miss Marissa Bradford, Boone Co., Mo.; 2nd. prem. $3, Miss Jennie Winn. St. Louis; 3rd. prem. $2, Don Holthaus, St. Louis.

Ornamental Needlework, (20 entries).—1st prem., $10, Mrs. J. T. Bellinger, St. Louis; 2nd. prem. $5, Mr. N. Ravold, St. Louis.

Chemise, Embroidered, (13 entries).—1st. prem. $10, Mrs. E. E. Rice, St. Louis; 2nd. prem., $5, Miss Nellie Kevil, St. Louis.

Embroidered Handkerchief, (5 entries).—1st. prem. $6, Mrs. S. S. Custis, St. Louis; 2nd prem. $3, Miss Huber, St. Louis.

Infant Dress, Embroidered, (7 entries).—1st. prem. Lillie Agnes Macklin, St. Louis; 2nd. prem. $5, Miss Mary Long, St. Louis.

Embroidered Infant's Cap.—1st. prem. $3, Mrs. Geo. K. Budd, St. Louis.

Embroidered Infant's Skirt, (4 entries).—1st. prem. $6, Mrs. W. B. Ryder, St. Louis; 2nd. prem. $3, Mrs. F. P. Hodgen, Pittsfield, Ill.

Carriage Affghan, (14 entries).—1st. prem. $15, Mrs. Bart Able, St. Louis; 2nd. prem. $10, Mrs. Barrett, St. Louis.

Infant Affghan, (8 entries).—1st. prem. $5, Mrs. W. B. Ryan, St. Louis; 2nd. prem. $2, Mrs. Charles Kellogg, St. Louis.

Worsted Tapestry Work.—1st. prem. $10, Mrs. Wm. Blow, St. Louis.

Silk Embroidery.—1st. prem. $25, Mrs. S. S. Curtis, St. Louis; 2nd. prem. $15, Miss S. S. Britton, St. Louis; 3rd. prem. $5, Mary A. Walker, St. Louis.

Worsted Tapestry.—1st. prem. $10, Mrs. Wm. Blow, St. Louis.

Worsted Tapestry, picture.—1st. prem. $20, Miss Sophie Eadman, St. Louis; 2nd. prem. $10, Miss Johanna Keep, St. Louis.

Worsted Embroidery.—1st. prem. $15, Miss Caroline Kolfe, St. Louis; 2nd. prem. $10, Mrs. W. R. Edwards, St. Louis.

Worsted Upholstery, girl under fourteen.—1st. prem. $8, Lizzie Bollinger, St. Louis; 2nd. prem. $4, Lizzie W. Bernard, St. Louis.

Embroidered Cover, for chair.—1st. prem. $10, Mrs. D. F. Kaime, St. Louis.

Silver Embroidery. — 1st. prem. $10, Mrs. J. B. Moon, St. Louis.

Gold Embroidery. — 1st. prem. $10, F. Vinu, Philadelphia; 2d. prem. $5, Miss Fannie Oesterreicher, St. Louis.

Bead Embroidery. — 1st. prem. $10, Mrs. N. Schnapp, St. Louis; 2nd. prem. $5, Miss Mary E. Long, St. Louis.

Chenelle Work. — 1st. prem. $5, H. Ravold, St. Louis; 2nd. prem. $2, Miss Ada Deagle, St. Louis.

Chenelle Work, with gold. — 1st. prem. $10, Mrs. J. P. Moon, St. Louis; 2nd. prem. $5, Miss Ada Deagle, St. Louis.

Chenelle Work, silver. — 1st. prem. $10, Mrs. J. B. Moon, St. Louis.

Ornamental Leather Work.—1st. prem. $5, Mrs. M. C. Ball, St. Louis.

Application Work. — 1st. prem. $6, Mrs. Wm. Blow, St. Louis; 2nd. prem. $3, Miss Fannie Oesterricher, St. Louis.

Application Work, lace. — 1st. prem. $6, Mrs. C. Steille, St. Louis; 2nd. prem. $3, Miss Snow, St. Louis.

Picture Frames of Hair, Shells, &c.— 1st. prem. $5, Mrs. M. J. Morrison, St. Louis; 2nd. prem. $2, Miss J. Kate Marney, St. Louis.

Agricultural Wreath. — 1st. prem. $5, Mrs. M. Wilson, St. Louis.

Artificial Flowers.—1st. prem. $5, Mrs. C. Prin, St. Louis.

Wax Flowers. — 1st. prem. $10, Mrs. Watkins, St. Louis; 2nd. prem. $5, Laura L. Townsend, St. Louis.

Hair Flowers. — 1st. prem. $5, Miss Louise Behier, St. Louis; 2nd. prem. $2, Mrs. L. C. Waite, St. Louis.

Leather Flowers.—1st. prem. $5, Miss T. C. Pratt, St. Louis.

Flowers, worsted.—1st. prem. $5, Mary Cangton, St. Louis; 2nd. prem. $2, Mrs. Julia Hutchinson, St. Louis.

Wax Fruit.—1st. prem. $5, Miss Girard, St. Louis; 2nd. prem. $3, Miss Girard, St. Louis.

Ornamented Wax Work. — 1st. prem. $10, Miss Maggie Garnier, St. Louis; 2nd. prem. $5, N. S. Currie, St. Louis.

Corsets.—1st prem. dpl. and $10, Mrs. E. J. Harding, St. Louis; 2nd prem, medal, Miss Overbach, St. Louis.

Display of Bonnets.—1st. prem. dpl. and $10, Mrs. E. Clifford, St. Louis; 2nd prem. medal, Madame Episey, St. Louis.

Lady's Dress.—1st prem. dpl. and $10, Grover & Baker S. M. Co., St. Louis; 2nd prem. medal, Madame E. Bahue, St. Louis.

Paper Patterns.—1st. prem. dpl. and $5, Mrs. E. J. McKim, St. Louis; 2nd prem. medal, E. Buttrick & Co., New York.

Carriage Afghan.—1st prem. dpl. and $25, Mrs Bart Able, St. Louis.

Worsted Embroidery, [Cheever, Barr & Co., P]—1st prem. dpl. and silver-plated basket and $15., Mrs. Wm. Blow, St. Louis.

Silk Embroidery, [D. C. Panard & Co., P].—1st prem. dpl., and silver ware, worth $10. See report.

Underwear.—790. See report.

Gentleman's Wig.—1st prem. dpl. and $10, M. J. Campbell, St. Louis.

Wig for Ladies.—1st prem. dpl. and $10, C. Francois, St. Louis.

Display of Wigs.—1st prem. dpl. and $10, M. J. Darcel, St. Louis.

Coat of Fine Material.—1st prem. dpl. and $10, J. C. Zallen, St. Louis.

Pants of Fine Material.—1st prem. dpl. and $10, J. C. Zallen, St. Louis.

Vest of Fine Material.—1st. prem. dpl. and $5, J. C. Zallen, St. Louis.

Suit of Clothes.—1st prem. dpl. and $10, Ticknor & Co., St. Louis.

CLASS H.

GEOLOGICAL, MINERAL AND CHEMICAL DEPARTMENT.

H. CLAY HART, SUPERINTENDENT.

This would be an odd department for an ordinary agricultural show, but is quite legitimate in this. The St. Louis Fair is intended as a grand exposition, not only of the products of the agricultural and mechanical industries, especially of the West, but of the mineralogy, geology and other branches of the physical sciences as they are developed in Missouri and other portions of the United States. Missouri has no gold fields, but her metals and minerals are limitless in extent and incalculable in value. Her wealth in this respect is beyond computation. Missouri has, within an area of ten miles square, iron ore enough to supply the wants of the whole world for centuries to come, and from her large territory could be gathered the materials for one of the finest museums of mineralogy and geology in America or Europe. While two-thirds of the State may be classed as number one farming land, much of this, and nearly all of the other third, are underlaid with valuable minerals and metalic ores. Here are coal fields that cover some millions of acres, while iron, and lead, and zinc are scattered more or less profusely over the southern portion of the State. It is doubtful if there is another State in the Union that, in the proportion of its area, can give employment and subsistence to so many millions as Missouri.

HALL TOO SMALL.

The hall devoted to the use of this department was too small to accommodate the wants of exhibitors, and some interesting displays were prevented from coming to the Fair because there was no space left. This is accounted for by the fact that the exhibition of mineralogical, geological, chemical and pharmaceutical specimens was greatly in excess of any former year. The deficiency in regard to room will probably be remedied before another year. As matters are this year, it is almost impossible for Prof. McArdle—the gentleman in charge of the exhibition—with all his administrative ability, to so arrange and classify the different articles as to make them easy of inspection.

But, after all, the general effect of the exhibition in this class is very good. Prof. H. L. Litton, of Washington University, exhibits a rare cabinet of specimens of zinc, lead, cobalt, nickel and cinnibar ores. He also has a large number of specimens of crystalline forms of calcite-serpentine beryl, and fragments of crystalline schists of various formations. Dr. Stevens also has on exhibition a cabinet of rare specimens, illustrating the geology and minerology of Missouri, as well as specimens from various European and Asiatic countries. Among the most interesting features of this cabinet are the Indian relics, such as axes, pipes, arrows and utensils, collected for the most part in St. Louis county. Dr. Litton's collection is particularly rich in rare specimens, not only in metallic ores proper, but also in the variety of beautiful fragments, illustrating the geology of several parts of Europe. A large piece of malachite from the Ural mountains attracted much attention. We particularly noticed some beautiful crinoids, from St. Louis county, in the cabinet of Dr. Stevens. A bird on its nest, encased in an incrustation of carbonate of lime, brought from a fountain in Italy, also illustrated the silent forces which nature is ever employing to change the forms of matter. In the display of chemicals, oils, grocers' sundries, cabinets, illustrating the entomology of the State, herbariums, and ornithological specimens, were exhibited, which in a most striking manner displayed the patient toil of those who take an interest in the natural history of the State, and prove that we have in this State as earnest, as devoted and as indefatigable workers in the department of natural science as can anywhere be found. True, the collections are not so large, the classifications not so exact as in some collections we have seen, but all beginnings in such fields of thought and investigation must necessarily be somewhat imperfect. The exhibition of specimens from our own State in this department of geology and minerology is sufficient to convince any one that nature has been most munificent in her bestowments to those destined to dwell within her limits.

Mr. Theodore Kalb had on exhibition a case of chemists' glassware, which in a full measure illustrated the ingenuity of the human intellect, in contriving means to accomplish ends. The apparatus contained in this case was sufficient to make almost any experiment, and of course formed a feature among the many objects of interest in the hall. In the department of

MINERALOGY

The specimens were very numerous and well classified, especially in the ores and minerals of Missouri. The principal exhibitors are the Southwestern Lead and Mining Company, Messrs. Belt & Kyne, and Mr. Joseph E. Ware, who exhibited a rich collection from Colorado, Montana, Nevada, California, Arizona, Utah and Idaho. The collections exhibited by Messrs. Belt & Kyne and the Southwestern Lead and Mining Company embrace a large number of specimens from various counties of southern and southwestern Missouri, and include different combinations in iron ore, copper, tin, zinc, lead and cobalt. Belt & Kyne also displayed specimens of bituminous and cannel coal, taken from the mines of the Lincoln County (Mo.) Coal and Mining Company. The St. Louis Denver Mining Company had on exhibition nine silver bricks, weighing in the aggregate a little more than half a ton, and representing something more than $20,000 in value. These ingots were reduced at the Company's works in Georgetown, Colorado. In addition to these tempting blocks of the precious metal, Mr. Downing, the President of the Company, had a rich collection of silver ores, taken from mines being developed in that Territory. Specimens of sulphuret of silver taken from the Clift lode, which yields $4,141 of pure metal per ton, attracted a large share of attention. Specimens from the O. K. mines, which yielded $3,900 per ton, was regarded as very desirable stones to invest in. There was also on exhibition a large collection of silver ores and gold quartz from other mines in the neighborhood of Georgetown. The mines represented by specimens are the Accident, Terrible, Compass and Square, Magnet, Equator,

Marshall, Mendota, Cashier, Mammoth, Dives, James, Guthrie, Silver Plume, Snow Drift, and many others, representing ores yielding from $40 to $800 per ton. The intrinsic value of the ores exhibited is about $5,500 in the Colorado department alone.

GEOLOGY.

The cabinet of geological specimens exhibited by Prof. Litton, of Washington University, though not very large, is exceedingly valuable. Some of his specimens are very rare, such as are seldom seen in cabinets in this country. Some of the fragments of rocks of a crystalline structure are exceedingly beautiful. Agates, amethysts, crystallized quartz, and spars of rare tints or shades of color, and beautiful crystalline forms constituted attractive features in this small but excellent collection. Serpentine and beryl represented the non-crystalline rocks. The collection of Dr. Stevens, though perhaps not so valuable or containing so many specimens rarely to be met with, was yet very attractive. A pipe carved in stone by an Oregon Indian, is quite a curiosity. This cabinet is also rich in relics of the aborigines, such as axes of stone, arrow-heads, and various utensils of stone in use among the Indians before the country was known to Europeans. Beautiful specimens of calcite, crinoids and agates, were also attractive features in this cabinet. In the department of

ORNITHOLOGY

There was only a fair exhibition. Prof. John P. Bates had on exhibition a very nice collection of stuffed birds, representing various classes, orders, species and genera of the feathered tribe. The case of stuffed humming birds attracted a full share of attention. There are also several fine specimens of tropical birds, the rich plumage of which was quite a feature in that part of the hall. The collection in this department was not so rich in rare specimens as we could wish, but the only entry was a really valuable collection.

ENTOMOLOGY.

It must have been gratifying to the citizens of St. Louis and Missouri to note the steady advances made by students in this new and comparatively fresh field of investigation. The collection of beetles, bugs, flies, butterflies, and, indeed, almost every species of the inhabitants of the insect world, prepared by Miss Josie Murtfeldt, of Kirkwood, exhibited not only the progress made in this field of investigation, but the care, patience and skill of the student engaged in the task. The collection is rich in specimens of insects caught principally in this State. In the department of

BOTANY

There was only one entry. Miss Josie Murtfeldt had on exhibition a well-arranged herbarium, filled with specimens of plants indigenous to this State. The collection embraces about 500 varieties, arranged according to their order, class, genera and species. Competent judges give it as their opinion that the arrangement and evident care bestowed upon this extensive collection was, perhaps, unsurpassed by any similar work in the State.

CHEMICAL.

In this department we embrace all articles chemically compounded, also all apparatus used in making chemical experiments, and the manufacture and combining of various substances useful or beautiful.

In this department the chief display in the hall allotted to exhibitors in Class H. was made.

One of the most attractive displays made was the goods manufactured by Anheuser & Eisenhardt, a column of variegated soap standing on a base of the same material, resembling mottled Tennessee marble, was surmounted by a beautiful bust of soap, white as Paros and polished as Italian marble. This conception of an antique work of art, moddled in soap, attracted a large share of attention. A sun, constructed of sperine candles, gilded and polished, with a center face in *relievo*, was another conceit that called forth admiring comments.

In the display of oils and other preparations of petroleum, there is a falling off from exhibitions of former years, as to the amount exhibited. But there were two

firms who were on hand with a large assortment. Mr. Wheaton had on exhibition fine samples of crude, lubricating, and highly refined oils. Messrs. Filley & Gregory also had a stand of samples which added to the variety of the oil exhibition.

One of the most attractive displays in the hall of Class H. was that made by Husbands Bros., an exhibition of grocer's sundries. The vast number of articles, the care and taste with which they were arranged, conspired to render this one of the most attractive corners in the building.

The display of chemical apparatus, and chemical glassware is far better, it is said, than ever before seen at the Annual Fair of the St. Louis Association. Among the curious little instruments to be seen in this department is a galactoscope, which we may explain is an instrument to determine the purity of milk. The same exhibitor also has on exhibition a most elegant assortment of chemists' apparatus and glassware, graduated tubes, thermometers, barometers, bell glasses, lamp furnaces, etc.

In the department of pharmacy the display is very good. Jones & Sibley, Crawford & Richardson, have each a fine collection, which adds no little to the general attractiveness of the hall.

For many of the premiums offered in this class there were no entries, and consequently no goods on exhibition. In fossils, Dr. Hambach had a very creditable display, but for the best collection of shells illustrating the conchology of Missouri, for which a premium of $20 was offered, there were no entries. We would suggest to the family of fishermen, and others whose business leads them to be about and in the water, that they proceed to make a collection of muscle, periwinkle, naide and other easily secured shells in fresh waters, in order that our great State, so rich in minerals, and prolific in vegetable productions, should at least be able to make something of a show in shells, either hard or soft.

The hall bore evidence of the improvements made during the preceding evening and the early morning. Quite a large number of new specimens in various departments had been introduced, and such changes as observation and a cultivated taste had suggested had been made in the many objects already on exhibition.

On yesterday it was ours to deal with the rocks, the forms of beauty moulded by the silent forces of nature—to note the varied turns—the wondrous perfection of crystalline forms of matter, wrought by the *vita natura* in the vast stretch of ages, since Time began. In this department of the exhibition we have perhaps said enough. We have described specimens of ores of gold from the mountains and valleys of California and Colorado, we have told of the rich lodes of silver-bearing stones from Colorado, Nevada, Montana, Utah, Arizona and Idaho. We have described crystals of various forms from many different localities, chalcedonys from Switzerland, malachites from Russia, agates from the Alps, serpentines from the Ural, beryls from the Caucasus, and calcites from all the countries on the globe. And equally useful, if not so beautiful, we have not forgotten the old red granite, and the lighter hued sandstone, which are as indispensable in the construction of palaces as the topazes, emeralds, agates and amethysts are valuable in the manufacture of jewels to adorn those who reside in the palaces. Nor have we neglected to pay our attention to the various combinations of iron in ores, such as hematite, specular, sulphurets, carbonates, etc. Nor did we neglect to speak of the tin stones, zincblends and lead carbonets, sulphurets and oxides, with rare specimens of chromates and other combinations of this valuable metal. We also told of ores of cobalt, copper, etc., black, ugly, unsightly and unseemly as they may be. Yet are these ugly specimens the original forms in which nature chose to leave the material that incases the gem that flashes upon the bosom of the belle, and the brilliant jewels that adorn fingers, arms and ears.

But, after all, what would these unwrought particles be, hidden among the dross and covered by the concretions of ages, were it not for the labor of man, and the labor, too, of a class who are not

honored by the muse, or sung by the poet? Great and good men, no doubt, who have reared monuments that all seek, admire, and strive to attain. We have no regrets, therefore, in passing from the study of the forms of matter which nature gave, and turn to the more attractive form which the conception of the mind, and the cunning hand of man have made it take.

A chief attraction in this class was the beautiful collection of chemical and pharmaceutical articles, grocers' sundries, fancy articles, useful and ornamental goods for the family and for the toilet. We would not be able to give the general reader an idea of the attractive display in these departments without particularizing to some extent.

Because we know not to what particular department to refer it, we cannot omit to notice in this place, the model of a furnace for reducing precious ores, such as those of gold, silver and platinum. This model was placed on exhibition by Messrs. Ware & Kendall, who also exhibit a fine collection of ores from the territories. The main feature of this furnace is the inverted blast, which causes a saving of all the volatile portions of the metal which might otherwise be carried off. It is both reverberatory and blast in action.

PHARMACEUTICAL DISPLAY.

In this department the display is very fine, better, it is said, than ever before seen. We are not competent to decide this point, nor do we know that it is necessary in order to establish the fact that the chemist has been at work and the pharmaceutist has profited by his experiments and experience.

Wm. H. Crawford & Co. have a case of pharmaceutical preparations that attract universal attention. The various tinctures, fluid extracts, and distillations of various articles in the materia medica are put up in handsome cases and were manufactured in this city.

Tilden & Co., a drug firm of New York, also have on exhibition a very extensive case of articles in the department of pharmacy. Perhaps there is a larger number of separate articles in this than in any on exhibition.

The Enno Sander Manufacturing Company also have on exhibition a splendid case of pharmaceutical preparations. This case, in the judgment of the committee on awards, was esteemed the best, and to it the premium was awarded, but a new committee has been asked for to review the grounds upon which the award was made.

DRUGGISTS' AND GROCERS' SUNDRIES.

Messrs. Dimmitt & Hale have on exhibition a magnificent display of druggists' sundries. This case embraced a large assortment of perfumeries of their own manufacture. There is also a handsome collection of fancy articles—everything necessary to furnish the druggist for the retail trade. This fine collection was awarded the premium.

The display of grocers' sundries made by Husbands Bros., already mentioned, was very creditable to the city, and was indeed regarded as the finest display in the line of fancy groceries ever before made at the Fair. Both the collection of druggists' and grocers' sundries attracted a large share of attention.

MISCELLANEOUS.

There are many things on exhibition not properly referable to any of the classes mentioned. Of course very few of these articles could be manufactured without the aid of chemistry. In the line of chemicals proper, there was a very fine display from the chemical works of G. Millinckrodt. This case of chemicals shows that even in the West we are not behind in the production of those articles which, in the not distant past, were brought from the East.

A case of perfumery exhibited by Wm. H. Crawford, was thought by many to be one of the most elegant collections of the finest odors ever brought to this place. To this collection the committee awarded the diploma.

Messrs. Forbes Bros. & Co., exhibited about forty samples of teas from China and Japan, of their own importation. These teas were quite an attraction to the throng of ladies who visited the hall of class H.

They also exhibited a full tea-set of Japanese porcelain, the actual cost of which in Japan was $110. Of course, delicate fingers were busy during a great part of the day in examining these beautiful pieces, brought from the distant East.

Messrs. Zibell & Rober had on exhibition a fine collection of copper ingots reduced from the ores at their works in this city. The ore from which these bars were obtained was taken from the mines in Franklin county, in this State.

There were on exhibition an endless list of minor articles, which space will not permit us to mention in detail. Joseph Ryan, an honest working man, and well-known among river men, exhibited a number of specimens of boiler incrustations, hard as granite, which he had taken from steamboat boilers. These scales ranged from three-quarters to one and a half inches in thickness, and go far to show why there are so many terrible explosions. Mr. Ryan has invented a compound to prevent such incrustations, samples of which secured an honorable mention and a diploma.

The galactoscope exhibited by Mr. Ulrich Harder was regarded with curious eyes by not a few of the visitors at the Fair. The wonder with many of our country cousins, was how "such a tiny thing could tell how rich the milk is." This little instrument was awarded the diploma.

Putty was exhibited by Messrs. Boucher & Wolkemitz, and cotton seed oil by Mr. C. C. Fuller, both of which articles secured honorable mention by the committee on awards. Horsford's self-raising bread preparation, exhibited by F. R. Rozier, made quite a display. The Indexical Soap Company had quite a handsome display. There were many other things shown which deserve more than a passing notice.

During the day the committee were engaged, and awards for most of the articles entered on the regular list were made. These we give below:

Specimens Illustrating Minerology of Missouri.—1st. prem. $100, Belt & Kyne, St. Louis.

Lead Ores of Missouri.—1st. prem. $50, Southwestern Lead and Mining Bureau.

Collection of Useful Minerals in Missouri, including Lead, Limestone, Sandstone, &c.—1st. prem. $50, Belt & Kyne, St. Louis.

Minerals, from all parts of the world.—1st. prem. $50, Dr. H. Litton, St. Louis.

Zinc Ores and Zinc—1st. prem. $20, Missouri Zinc Co., St. Louis.

Iron Ores and Iron.—1st. prem. $20, Belt & Kyne, St. Louis; honorable mention, J. A. Buckland, St. Louis.

Collection, from a single mine.—1st. prem. $10, Belt & Kyne, St. Louis.

Gold, Silver and Mercury, from the Territories.—1st. prem. $20, J. E. Ware, St. Louis.

Fossils, from Missouri.—1st. prem. dpl., Dr. Hambach, St. Louis.

Insects, from Missouri. — 1st. prem. $10, Miss M. E. Murtfeldt, Kirkwood, Mo.

Botanical Specimens.—1st. prem. dpl. and $10, Miss Josie Murtfeldt, Kirkwood, Mo.

Collection Birds, living and stuffed—1st. prem. $10, John P. Bates, St. Louis.

Specimens Bituminous Coal—1st. prem. $30, Belt & Kyne, St. Louis.

Specimens Cannel Coal. — 1st. prem. $10, Belt & Kyne, St. Louis.

Specimen Building Stone.—1st. prem. $10, Grafton Stone Co., St. Louis.

Specimens of Coke.—Honorable mention, W. McPheeters, Harmony, Ind.

Best Collection Chemicals, Missouri manufacture.—1st. prem. dpl. and $50, G. Mallinckrodt & Co., St. Louis.

Collection Pharmaceutical Preparations, Missouri manufacture.—1st. prem. dpl. and $50, Enno Sander Manufacturing Co., St. Louis.

Sugar Coated Pills.—Dpl., W. R. Warner & Co., Philadelphia.

Collection of Chemicals, from distillation of wood. — 1st. prem. dpl. and $10, Oestreicher & Co., St. Louis.

Assortment Chemical Glassware.—1st. prem. dpl. and $15, Theodore Kalb, St. Louis.

Assortment Druggists' Sundries. — 1st. prem. dpl. and $20, Dimmitt, Hale & Co., St. Louis.

Collection Mineral Waters.—1st. prem.

dpl. and $10, Enno Sander Mnfg. Co., St. Louis.

Collection Chemical or Pharmaceutical Preparations, American manufacture.—1st. prem. dpl. and $25, G. Mallinckrodt & Co., St. Louis; honorable mention, Tilden & Co., N. Lebanon, N. Y.

White Lead, pure — 1st. prem. dpl. and $20, Boucher & Wolkewits, St. Louis.

Substitute for White Lead.—Honorable mention, Averill Chemical Paint Co., Cleveland, O., by Geo. Partridge & Co., St. Louis.

Mineral Paint.—1st. prem. dpl., Mineral Paint Co., Sterling, Ills.

Variety of Ochres.—1st. prem. dpl. and $10, C. LaCroix Paint Co., St. Louis.

Linseed Oil.—1st. prem. dpl., Filley & Gregory, St. Louis.

Variety of Soaps. — 1st. prem. dpl., Anheuser & Eisenhardt, St. Louis.

Variety of Fancy Soaps.—1st prem. dpl., F. R. Robinson, St. Louis.

Wagon Grease.—1st. prem. dpl., Filley & Gregory, St. Louis.

Oils, from Petroleum.—1st. prem. dpl. and $10, E. S. Wheaton, St. Louis.

Tallow Candles.—1st. prem. dpl. and $5, Anheuser & Eisenhardt, St. Louis.

Star Candles.—1st. prem. dpl. and $10, Anheuser & Eisenhardt, St. Louis.

Paraffine Candles.—1st. prem. dpl. and $5, Anheuser & Eisenhardt, St. Louis.

Castor Oil.—1st. prem. dpl. and $10, Richardson & Co., St. Louis.

Lard Oil.—1st. prem. dpl., Anheuser & Eisenhardt, St. Louis.

Potash—1st. prem. dpl., B. T. Babbitt, N. Y., by Husbands Bros., St. Louis.

Vinegar.—1st. prem. dpl. and $8, M. Foster & Co., N. Y., by Husbands Bros., St. Louis.

Soda.—1st. prem. dpl., B. T. Babbitt, N. Y., by Husbands Bros., St. Louis.

Assortment Essential Oils.—1st. prem. dpl. and $10, S. Cohen, N. Y., by Husbands Bros., St. Louis.

Assortment Flavoring Extracts.—1st. prem. dpl. and $20, S. Cohen, N. Y., by Husbands Bros., St. Louis.

Assortment Perfumery.—1st. prem. dpl. and $20, W. H. Crawford, St. Louis.

Shoe.—1st. prem. dpl. and $5, Barber, Adamson & Co., Cincinnati, O.

Manure, for farm purposes, most available and economical.—1st. prem. dpl. and $20, Knablash & Brummer, St. Louis.

Composition Roofing.—1st. prem. dpl. Pomeroy & Dietricks, St. Louis.

Shoe and Leather Blacking.—1st. prem. dpl. and $5, J. S. Mason & Co., Philadelphia, by Husbands Bros., St. Louis.

Writing Inks.—1st. prem. dpl., Peter Worle, by Husbands Bros., St. Louis.

Stove Polish.—1st. prem. dpl., Milwaukee Stove Polish Co.

Wash Blue.—1st. prem. dpl. and $5 Husbands Bros., St. Louis.

Disinfectant.—1st. prem. dpl. and $5 G. Mullinkradt & Co., St. Louis.

Baking Powder, 6 entries.—1st. prem. dpl., Royal Baking Powder Co., N. Y. by Woodward & Garesche, St. Louis.

Best Domestic Pure Liquors.—1st. prem. dpl. and $10, L. A. Delime, St. Louis.

Medicine Chest.—1st. prem. dpl. and $10, Enno Sander Manufacturing Co., St. Louis.

Ground Mustard.—1st. prem. dpl. and $10, Woodward & Garesche, St. Louis.

Display of Ground Spices.—1st. prem. dpl. and $10, Woodward & Garesche, St. Louis.

Lumber Pencils.—1st. prem. dpl., J. Dixon, Crucible Co., Jersey City.

Lubricating Plumbago. — Honorable mention, J. Dixon, Crucible Co., Jersey City.

Crucible Plumbago.—Honorable mention, J. Dixon, Crucible Co., Jersey City.

Galactoscope.—1st. prem. medal, Uriah Harder, St. Louis.

Anatomical Display, horses' feet, etc.—1st. prem. dpl., John Kirman, U. S. Arsenal, St. Louis.

Yeast.—1st. prem. Fleischman & Co. St. Louis.

Lightning Rod Point.—1st. prem. dpl., Cole Bros., St. Louis.

Coffee, display.—1st. prem. dpl., Renshaw & Co., St. Louis.

CLASS I.

POULTRY, SHEEP AND SWINE.

L. L. ASHBROOK, SUPERINTENDENT.

Here is a department to bring water into the mouth of a hungry epicure. Think of spring chickens broiled, fall chickens roasted, capons boiled; think of Brahmas, Cochins, Dorkings, Dominiques, Leghorns, Creve Cœurs, Houdans, Le Fleche, red, black and blue, Games, Polands, Hamburgs, etc. Then think of four or five varieties each, of ducks, geese and turkeys. Think of the delicate canvas-backed duck, of the roasted goose, and the famous *pate de foi gras*, made from overgrown goose livers; and then of the lordly turkey, the only bird fit to grace the Christmas feast. Think, too, of quails on toast, grouse steak, pigeon pie, peacock's tongues, and last, though not least, of lop-eared Angola, and Turkish rabbits. These last may not be poultry in the strictest sense of the word, but they have been thrust in here, because they are nearer akin to this department than any other. The same thing occurs to some extent throughout the Fair Grounds. The classification is well enough, but the exhibition has outgrown the buildings and the grounds, so that animals and articles for exhibition have to be accommodated wherever space can be found.

Then, think of the sheep, not more for their chops, legs and saddles of fat mutton, than for their fleecy covering that assumes so many shapes of comfort and beauty; and then of the swine, the filthiest of all four-footed beasts, and yet one that does more to tickle the palate of the rich gourmand, and satisfy the cravings of the poor man's hunger, than any other domestic animal; that is easily reared into noble proportions, and yields rich stores of substantial food or delicate nutriment to all the children of men. Think of spare-ribs, tender-loins, sausage and pig's feet, that come in such profusion in the meat-eating season of the year; think, too, of the baked pork and beans and the ham and eggs that come at all seasons, and then be thankful for improved breeds of swine, that have come with the advent and influence of the St. Louis Fair.

And here we are inclined to reverse the order of the Fair programme, placing pork before poultry; the poor man's feast before the rich man's fancy. Swine do not deserve this precedence of place

on account of their natural beauty. In fact, if there is anything superlatively dirty, hideous, ugly and utterly repulsive, it is the unimproved, uneducated, uncivilzed hog. What is more monstrous and frightful in appearance than a wild boar? Or even the long-legged, long-eared, long-faced, long-tusked, long-haired and slightly improved descendant of this fierce beast of the old European forests? No wonder they were put down as unclean beasts under the old law of Moses. No wonder the devil went into a herd of them as the fittest habitation he could find.

But turn from this horrid picture of savage fierceness, foulness, filth, bristles, bones and dirt, to contemplate the hog of the period. Think of him in his infancy, before he has been guilty of a grunt—that gentle, squeaking, almost beautiful pig. He has but a single infirmity. Like the "fat boy" in Pickwick, he lives only to eat. But then think of that essential and most enticing feast, immortalized by the "gentle Elia," which he proffers to us in the shape of "roast pig." As he grows into a great, grunting swine, of two or three hundred pounds weight, his hoggish proclivities show themselves in more slovenly habits and greater obesity. He wallows in the mire, if he has a chance, and eats without distinction almost everything that goes to his trough. But then, when neatly slaughtered, packed, pickled and smoked, his porcine majesty can furnish a hundred tempting dishes to tickle the palates of all Christian people. When the same hog is fed to repletion, and forced up to a weight of eight hundred or a thousand pounds, he is fit for nothing but the show pen or the lard tierce—he becomes a huge grease spot, and then passes away forever.

The vast improvement in swine, shows better than almost anything else, what may be accomplished by intelligent cross-breeding and "natural selection." Give to a stock-breeder of ordinary common sense, scientific knowledge and practical experience, sufficient time to work out his experiments, and he will produce animals possessing almost any desired peculiarities. Amongst swine, he will produce heavier joints and lighter sides, if the public taste should demand such a change; and so with every species of domestic animals. Give but the time and opportunity, and every variety will be furnished by the intelligent stock-breeder.

DEPARTMENT OVERCROWDED.

Like almost every other class in this great exposition, the hog division is greatly overcrowded. During the first day and night of the Fair, aid was called in, and pen accommodation for two hundred more hogs was provided. Nor were the pig pens neglected by the sight-seeing crowds. On the contrary, multitudes swarmed thither every day of the Fair. Not merely hog-growers and pork

packers, but every class of visitors to the Fair, including thousands of ladies and children, passed and repassed along the boarded alleys between the pens, delighted to inspect the fine specimens of piggish beauty, or hoggish obesity.

DIFFERENT BREEDS.

The Berkshire, which was about the first great improvement made in this country upon our common stock of native hogs, still holds a prominent place in public favor. His merits are so decided in character that they can neither be eclipsed nor set aside by new favorites. This breed was largely represented at the present Fair, by some of the finest specimens ever exhibited in this country. Then comes the Essex, another fine breed, that, like the Berkshire, took its name from the county in England where it originated—then the Suffolk, a still greater favorite, that originated in the same county, and a few of the old Irish graziers.

Of the breeds that have originated amongst American breeders, the Poland China, and the Chester Whites are conspicuous. The Poland Chinas had their origin in Butler county, Ohio, and are popularly known as the Magie breed, from D. H. Magie, its earnest friend and most persistent cultivator. This hog is black and white, or piebald, grows very large and rather coarse, but does not mature under two years.

Then comes the Chester White, said to have originated in Chester county, Pennsylvania. This hog may be put down as a first-class favorite amongst all Western pork producers and pork packers. They have a good constitution, are hardy and take on fat easily, which qualities adapt them to ordinary farm usage. They are described as particularly adapted to cross-breeding with the fine imported animals, and their progeny are said to mature early, and to possess the very best of digestive power. We quote the following authoritative description of them: The Chesires originated in Jefferson county, New York. They are white, with small, fine ears, short snout and developed cheek, long, square body, good shoulders and hams, and small bones. Although possessing good qualities, and worthy of cultivation, they do not seem to have attracted, as yet, any very great amount of interest.

The following is a description of the leading entries of swine: First in order comes the entry of Messrs. Shepard & Alexander, of Charleston, Coles county, Ills., which comprises thirty-six head of Poland Chinas, and which, with nothing invidious toward any others of the breed, were probably as fine specimens as were on the grounds. Among them were to be noted "Sweepstakes," a boar of 4 years of age, weighing 1,086 lbs.; "Lady Irene," his daughter, 2 years, weighing 860 lbs.; "Queen of Coles," another daughter 6 1-2 months, and several others which have won awards at the late swine exhibition in Chicago, and at the Illinois State Fair at Quincy, and which are certainly the best of their breed. Next comes the exhibition of John R. Craig, of Canada, of pure Berkshires, imported and native born. Among these are to be noted "Sambo," who won five prizes in England before his exportation. He is 2 years old and weighs 838 lbs., and, with other hogs of the same breed imported by Mr. Craig, took premiums at the National Exposition of Swine lately held in Chicago, and Fairs elsewhere. Among other fine specimens of the pure Berkshire exhibited by this gentleman, are the prize sows, "Young Octoroon," "Gipsy Queen," and a number of pigs, which are beauties to look at. Twenty-five of these are direct importations.

N. N. Jones, of Normal, Ills., exhibits twenty-four head of Chester Whites, among which are one boar weighing 700 lbs., one sow weighing 600 lbs., one fat barrow weighing 500 lbs., which are samples of the enormous development this breed is susceptible of.

Charles Snoad, Joliet, Ills., exhibits 40 Berkshires, 30 Chester Whites, and 8 Suffolks and cross-breeds—total 78 head.

L. W. Newland, of St. Louis county, has 14 on exhibition, consisting of Chester Whites, Poland Chinas and Berkshires, among which is especially distinguishable the sow "Betty," only two years and six months old, and weighing about six hundred pounds.

A. Bullard, Des Peres, St. Louis county, exhibits 32 Poland Chinas. This stock is composed of several crosses in which all the good qualities are retained. They are said to be very docile and easily fattened.

J. S. Berry, of St. Louis county, exhibits 24 Chester Whites. Among them are one boar, 20 months old, weighing 700 lbs., and one sow, 22 months old, 700 lbs.

J. S. McCreary, Canton, Ills., exhibits 25 head of Poland Chinas, among which are two three year old sows, weighing between 800 and 1,000 lbs., and two yearlings weighing 500 lbs. each.

Gen. Singleton, Quincy, Ills., exhibits 12 Berkshire breed, and including an imported Berkshire boar. Among them is a barrow, 16 months old, weighing 460 lbs.

Samuel Stratton, Litchfield, Ills., 17 head Berkshires, Chester Whites and Poland Chinas. Two of the former were imported, and the others are of pure blood, but were littered in this country.

C. M. Hawkins, St. Louis county, exhibits 2 pure blood Cheshires.

George M. Bedford, Ky., 26 Berkshires.

Adam Rankin, Monmouth, Ills., 75 head all Berkhires, and five of them imported.

S. H. Clay & Co., Paris, Ky., 64 imported and native Berkshires and Suffolks.

I. G. Bedford, Monroe county, Mo., 17 Berkshires.

E. C. Cunningham, St. Charles county, Mo., 58, nearly all crosses from Berkshires, Suffolks, Essex, Lincolnshires, Chesters, etc. Indeed, nearly all of the best foreign and native breeds were comprised in his exhibition, and were all fine specimens.

Gen. O. Guitar, Columbia, Mo., 20 Berkshires, among which are one imported boar, two years old, weighing 600 lbs; "1st sow, Shorbrook," five months, weighing 325 lbs., and 1 pig, 10 weeks old, 100 lbs.

L. Q. A. Floyd, Springfield, Ills., exhibits 24 head of Chester White, Poland Chinas and Berkshires.

Crowder & Bro., Springfield, Ills., exhibited 84 head of Berkshires, 24 of which are from Canada, and 4—3 sows

and 1 boar—were imported direct from England.

Chas. January, Ferguson Station, St. Louis county, exhibits 3 Berkshires and 3 Poland Chinas—all thoroughbreds.

Robert Nelson, Montgomery county, 3 pure Berkshires, 1 boar and 2 sows.

Dr. Nichols, St. Louis county, exhibits 16 Berkshires—10 ten weeks old, and 4 fifteen weeks old.

Capt. Phillips, St. Louis county, exhibits 2 Berkshires, a sow and a boar, five months old.

Dr. Benj. L. Stevens, Bridgeton, St. Louis county, exhibits 47 head Berkshires and Poland Chinas.

E. Driggs, Adrian, Michigan, 80 head—20 Essex and 10 Suffolks. Two Essex boars, one six months old, and 3 sows, were imported. One Suffolk boar, also, was imported.

S. R. Boets, Gravois, St. Louis county, Mo., exhibits 6 four months Berkshires.

G. Jackson, Warren county, Mo., exhibits 9 Berkshire, 7 of them young pigs. J. H. Pickrell, Macon county, Ills., exhibits 2 Berkshires, one boar and one sow.

SHEEP.

Since the day that righteous Abel brought the firstling of his flock to the altar as a token of his grateful piety, the sheep has always been recognized, not only as the most gentle and docile, but one of the most useful of domestic animals. We can hardly think of it as in a wild, untended condition. We associate with it nothing but innocence, meekness and gentleness. And then, too, nature has made them to contribute alike to our stores of food and raiment. Lamb and green peas in June are suggestive of lamb's wool early in December; and there is no season of the year that some portion of our wardrobe does not come from the fleecy covering of the sheep.

Notwithstanding this double hold upon our affections, the sheep exhibition secured less attention than that of the swine. In fact, the hogs were hoggish and took all the pens to themselves, and other inclosures had to be provided for the sheep in a locality not quite so convenient to the moving throng of visitors. But the sheep were there in greater numbers than at any previous exhibition, and of the very highest excellence in the different breeds. Among them are to be noted Cotswolds, Merinos, Leicesters, and Southdowns, the first-named predominating. The category of the breeds presented for competition for the premiums offered, and of their exhibition, is as follows:

Burdett Loomis, Hartford, Connecticut, exhibits 16 head of Cotswold rams and ewes, four of which are imported, and the balance bred in this country. The wool of this breed is of long fibre, and is valuable as combing wool, and they are distinguished further as good wool producers, and muttons, and for being good feeders.

G. Jackson, Warren county, Missouri, exhibits 58 head, mostly Cotswold, bred from imported stock. Among them were 4 lambs, two born in March and two in April of the present year, which are said to weigh from 150 to 160 pounds each.

Samuel Toms, Oshawa, Ontario, Canada, exhibits 27 Leicesters and Southdowns—nine rams and ewes of the former and the balance Southdowns.

J. H. Pickrell, Macon county, Ills., exhibits 20 head of Southdowns, among which are 9 pure ewes and 5 bucks.

Thomas Taylor, De Witt county, Ills., exhibits 36 Merinos, bred from imported stock in Vermont and Illinois.

J. Bell & Son, Brighton, Ills., exhibit 14 head, all Merinos of pure strain. These are a Spanish sheep, and the wool they yield is especially adapted for pulling.

William Forsyth, St. Louis county, exhibits 2 pair of Angola goats, bred from imported stock.

THE GALLINARIUM.

It may be safely said that there are few departments of the exhibition which attract a better attendance than this, for it is thronged during the entire day, and ladies especially seem to be its most interested visitors. And this has been a marked circumstance on every similar occasion. Whatever the cause may be, such is the fact. The present exhibition

is very extensive and largely increased in number of specimens and varieties, and to such an extent as to necessitate the erection of a building to provide for the increase, in addition to the wire pagoda, which formerly was sufficient to contain the number sent in for exhibition.

Among them are to be found all that are embraced in the schedule of premiums—Brahmas, Cochins, Dorkings, Dominiques, Leghorns, Creve Coeurs, Houdans, Games, in great variety, Bantams, Polands and Hamburgs, in all their varieties of plumage, and many of them as beautiful as it is possible to be. Among the largest of the representatives of the gallinaceous order are to be mentioned the Cochins, black, white, buff and partridge—all gigantic, majestic in mien, with heavy, protruding breasts—not specially suggestive of delicate roasts or juicy fricassees. Next in order of number on exhibition and of variety come games, duckwing, black, blue, Sumatra and Bantam, all light in frame and body, but clean built and compact, as they should be for the uses they are put to. We note also several variety of Polands, silver and gold spangled, black, light bodied, graceful, with head surmounted by a full feathered crown, and with a *tout ensemble* of fine feathers and plume. Following in importance of number were light and dark Brahmas, heavy and plump; Bantams, numerous, petite, graceful and spirited, gold-laced, silver-laced black and white; Houdans; Creve Coeurs, a large, strong variety, with head surmounted with a spreading crown of feathers, and bearded like a goat; Dorkings, in all variety of colors, a famous breed for laying, and so on through the whole schedule, and in full representation. The display of geese and ducks was very limited necessarily, nor could they command much interest under any circumstances. There were one or two specimens of wild geese, and several fine ones with foreign names, as Toulouse and Bremen; and Roman ducks, Cayuga ducks and Poland ducks, and white turkeys and black turkeys, the whole scene closing with rather a small display of pigeons of different varieties familiar to everybody, rabbits and white mice.

POULTRY.

Light Brahmas, (30 entries).—1st prem. $10, S. Stratton, Litchfield, Ills.

Dark Brahmas, (5 entries).—1st. prem. $10, J. C. Hatch, St. Louis.

Black Cochins.—1st. prem. $5, W. H. Turner, Butler, Ills.

White Cochins.—1st prem. $5, J. T. Campion, St. Louis.

Buff Cochins, (11 entries).—1st. prem. $5, J. T. Campian, St. Louis.

Partridge Cochins.—1st. prem. $5, J. C. Hatch, St. Louis.

Colored Dorkings.—1st. prem. $5, J. T. Campion, St. Louis.

Silver Gray Dorkings.—1st. prem. $5, J. T. Campion, St. Louis.

White Dorkings.—1st. prem. $5, G. P. Strong, St. Louis.

Dominiques.—1st. prem. $5, E. C. Freeman, Cobden, Ills.

White Leghorns.—1st. prem. $5, J. C. Hatch, St. Louis.

Creve Coeurs.—1st. prem. $5, J. C. Hatch, St. Louis.

Houdans.—1st. prem. $5, J. C. Hatch, St. Louis.

Black Breasted Red Games, (22 entries).—1st. prem. $10, Capt. J. H. Jones, St. Louis.

Duck Winged Games.—1st. prem. $10, Henry Nan, St. Louis.

Black Games, (6 entries).—1st. prem. $10, Thos. B. Gettys, St. Louis.

Blue Games, (12 entries).—1st. prem. $10, J. T. Campion, St. Louis.

Sumatra Games.—1st. prem. $10, J. T. Campion, St. Louis.

Gold Laced Bantams.—1st. prem. $5, J. C. Hatch, St. Louis.

White Bantams, (17 entries).—1st. prem. $5, L. Mills, Webster, Mo.

Black Bantams, (7 entries).—1st. prem. $5, J. T. Campion, St. Louis.

White Polands.—1st. prem. $5, Henry Robine, St. Louis.

Silver Pencilled Hamburgs.—1st. prem. $5, J. Q. A. Floyd, Springfield, Ills.

Silver Spangled Polands.—1st. prem. $5, W. H. Turner, Butler, Ills.

Golden Spangled Polands.—1st. prem. $5, J. T. Campion, St. Louis.

Golden Spangled Hamburgs.—1st. prem. $5, W. H. Turner, Butler, Ills.

Silver Spangled Hamburgs—1st. prem. $5, W. H. Turner, Butler, Ills.

Breed of Chickens, under 5 months.—1st. prem. $10, E. O. Freeman, Cobden, Ills.

Black Polands.—1st. prem. $5, H. Rohbein.

Largest Variety of Chickens.—1st. prem. $30, W. H. Turner, Butler, Ills.; 2nd. prem. $15, J. T. Campion, St. Louis.

Best Display of Chickens, prem. by J. C. Hatch & Co.—1st. prem. $50, W. H. Turner, Butler, Ills.

Best Display of Poultry, prem. by St. Nicholas Hotel.—1st. prem. $20, W. H. Turner, Butler, Ills.

Pair Light Brahmas, prem. by N. J. Coleman.—1st. prem. Rural World one year, J. C. Hatch, St. Louis.

Pair Dark Brahmas, prem. by N. J. Coleman.—1st. prem. Rural World one year, J. C. Hatch, St. Louis.

Pair Buff Cochins, prem. by N. J. Coleman.—1st. prem. Rural World one year, J. T. Campion, St. Louis.

Pair Ducks, Aleysbury—1st. prem. $5, W. H. Turner, Butler, Ills.

Pair Ducks, Cayuga.—1st. prem. $5, J. C. Hatch, St. Louis.

Pair Ducks, Poland.—1st. prem. $5, J. Gilford, St. Louis.

Pair Ducks, Muscovy.—1st. prem. $5, Miss S. A. McCausland, St. Louis.

Pair Ducks, Ronen.—1st. prem. $5, J. C. Hatch, St. Louis.

Pair Geese, Bremen.—1st. prem. $5, J. C. Hatch, St. Louis.

Pair Geese, Hong Kong.—1st. prem. $5, Christ Laguet, St. Louis.

Pair Geese, Toulouse.—1st. prem. $5, J. T. Campion, St. Louis.

Pair Geese, Wild.—1st. prem. $5, J. C. Hatch, St. Louis.

Turkeys, bronze.—1st. prem. $10, E. O. Freeman, Cobden, Ills.

Turkeys, white.—1st. prem. $10, J. T. Campion, St. Louis.

Trio of Turkeys, Planters' House premium.—1st. prem. $10, E. O. Freeman, Cobden, Ills.

Pigeons, Tumblers.—1st. prem. $5, Christ Laguet, St. Louis.

Pea Fowls—1st. prem. $10, Mrs. S. A. McCausland, St. Louis.

Singing Birds, collection.—1st. prem. $5, Charles Espich, St. Louis.

Rabbits, lop-eared.—1st. prem. $5, S. Hutton, St. Louis.

SHEEP—LONG-WOOLED.

Bucks, 2 years and over.—1st. prem. $25, Burdett Loomis, Hartford, Conn.; 2nd. prem. $10, Edward Iles, Springfield, Ills.

Bucks, 1 and under 2 years.—1st. prem. $20, Burdett Loomis, Hartford, Conn.; 2nd. prem. $10, Burdett Loomis, Hartford, Conn.

Bucks, under one year.—1st. prem. $15, Edward Iles, Springfield, Ills.; 2nd. prem. $5, G. Jackson, Wright City, Mo.

Ewes, 2 years and over.—1st. prem. $25, Edward Iles, Springfield, Ills.; 2nd. prem. $10, Burdett Loomis, Hartford, Conn.

Ewes, 1 and under 2 years.—1st. prem. $20, Burdett Loomis, Hartford, Conn.; 2nd. prem. $10, Burdett Loomis, Hartford, Conn.

Ewes, under 1 year.—1st. prem. $15, G. Jackson, Wright City, Mo.

MIDDLE-WOOLED SHEEP.

Bucks, 2 years and over.—1st. prem. $25, S. Toms, Oshawa, Canada; 2nd. prem. $10, J. O'Bannan, Eminence, Ky.

Bucks, 1 year and under 2.—1st. prem. $20, Alden & Gosling, Trenton, N. J.; 2nd. prem. $10, S. Toms, Oshawa, Canada.

Bucks, under 1 year.—1st. prem. $10, S. Toms, Oshawa, Canada; 2nd. prem. $5, J. O'Bannon, Eminence, Ky.

Ewes, 2 years and over.—1st. prem. $25, J. O'Bannon, Eminence, Ky.; 2nd. prem. $10, S. Toms, Oshawa, Canada.

Ewes, 1 year and under 2.—1st. prem. $20, J. O'Bannon, Eminence, Ky.; 2nd. prem. $10, S. Toms, Oshawa, Canada.

Ewes, under 1 year.—1st. prem. $15, S. Toms, Oshawa, Canada; 2nd. prem. J. H. Pickrell, Harristown, Ills.

FINE-WOOLED SHEEP.

Bucks, 2 years and over.—1st. prem. $25, J. Bell & Son, Brighton, Ills.; 2nd. prem. $10, Thomas Taylor, Waynesville, Ills.

Bucks, 1 year and under 2.—1st. prem. $20, Thomas, Taylor, Waynesville, Ills.; 2nd. prem. $10, Thomas Taylor, Waynesville, Ills.

Bucks, under 1 year.—1st. prem. $15, Thomas Taylor, Waynesville, Ills.; 2nd. prem. $5, Thomas Taylor, Waynesville, Ills.

Ewes, 2 years and over.—1st. prem. $25, Thomas Taylor, Waynesville, Ills.; 2nd. prem. J. Bell & Son, Brighton, Ills.

Ewes, 1 year and under 2.—1st. prem. $20, Thomas Taylor, Waynesville, Ills.; 2nd. prem. $10, Thomas Taylor, Waynesville, Ills.

Ewes, under 1 year.—1st. prem. $15, Thomas Taylor, Waynesville, Ills.; 2nd. prem. $5, Thomas Taylor, Waynesville, Ills.

Fat Sheep, wethers.—1st. prem. $10, J. H. Pickrell, Harristown, Ills.

Three Fat Wethers.—1st. prem. $20, J. H. Pickrell, Harristown, Ills.

Fat Ewe.—1st. prem. $10, J. O'Bannon, Eminence, Ky.

Three Fat Ewes.—1st. prem. $20, S. Toms, Oshawa, Canada.

Fat Wether, under 2 years.—1st prem. $10, Geo. Elliott, Harristown, Ills.

Three Fat Wethers.—1st prem., $10, Geo. Elliott, Harristown, Ills.

Fat Ewe, under 2 years.—1st. prem. $10, Burdett Loomis, Hartford, Conn.

Three Fat Ewes, under 2 years—1st. prem. $20, Burdett Loomis, Hartford, Conn.

Best Flock Sheep.—1st. prem. $50, Burdett Loomis, Hartford, Conn.

Best Buck and Three Ewes.—1st prem. $50, Edward Iles, Springfield, Ills.; 2nd. prem. $25, Burdett Loomis, Hartford, Conn.

Fat Sheep, (dressed), Barnum's Hotel premium.—1st. prem., $50, M. Riley, St. Louis.

Fat Sheep, (dressed), Planters' House premium.—1st. prem. $50, M. Riley, St. Louis.

Fat Lamb, (dressed), Planters' House premium.—1st. prem. $10, M. Riley, St. Louis.

SWINE—LARGE BREEDS.

Boars, 2 years and over.—1st. prem. $20, Chas. Snoad, Joliet, Ills.; 2nd. prem. $10, N. N. Jones, Normal, Ills.

Boars, 1 year and under 2.—1st. prem. $20, J. S. Berry, Sappington, Mo.; 2nd. prem. $10, O. M. Hawkins, Kirkwood, Mo.

Boar, 6 months and under 1 year.—1st prem. $20, E. C. Cunningham, St. Charles, Mo.; 2nd. prem. $10, N. N. Jones, Normal, Ills.

Boars, under 6 months.—1st. prem. $10, J. S. Berry, Sappington, Mo.; 2nd. prem. $5, N. N. Jones, Normal, Ills.

Sows, 2 years and over.—1st. prem. $20, J. S. Berry, Sappington, Mo.; 2nd. prem. $10, Chas. Snoad, Joliet, Ills.

Sows, 1 year and under 2.—1st. prem. $20, J. S. Berry, Sappington, Mo.; 2nd. prem. $10, Chas. Snoad, Joliet, Ills.

Sows, 6 months and under 1 year.—1st. prem. $20, N. N. Jones, Normal, Ills.; 2nd. prem. $10, Chas. Snoad, Joliet, Ills.

Sows, under 6 months—1st. prem. $10, Chas. Snoad, Joliet, Ills.; 2nd. prem. $5, J. S. Berry, Sappington, Mo.

BERKSHIRES.

Boar, 2 years and over.—1st. prem. $20, O. Guitar, Columbia, Mo.; 2nd. prem. $10, A. G. Herr, St. Matthews, Ky.

Boars, 1 year and under 2.—1st prem. $20, Crowder & Bro., Springfield, Ills.; 2nd. prem. $10, J. L. Bedford, Paris Ky.

Boar, 6 months and under 1 year.—1st. prem. $20, S. H. Clay & Co., Paris, Ky.; 2nd. prem. $10, S. H. Clay & Co., Paris, Ky.

Boar, under 6 months.—1st. prem. $20, A. Rankin, Monmouth, Ills.; 2nd. prem. $10, Crowder & Bro., Springfield, Ills.

Sows, 6 months and under 1 year.—1st. prem. $20, J. R. Craigh, Edmonton, N Y.; 2nd. prem. $10, J. H. Bedford, Paris, Ky.

Sow, 1 year and under 2.—1st prem. $20, J. J. Craigh, Edmonton, N. Y.; 2nd. prem. $10, G. Herr, St. Matthews, Ky.

Sow, under 6 months.—1st prem. $10, Crowder & Bro., Springfield, Ills.; 2nd. prem. $5, Crowder & Bro., Springfield, Ills.

SUFFOLK.

Boars, 2 years and over.—1st prem. $20, C. Snoad, Joliet, Ills.; 2nd. prem. $10, E. Driggs & Wood, Adrian, Mich.

Boar, 1 year and under 2.—1st prem. $20, S. Toms, Oshawa, Canada.

Boars, 6 months and under 1 year.—1st.

prem. $20, C. Snoad, Joliet, Ills.; 2nd. prem. $10, C. Snoad, Joliet, Ills.

Boar, under 6 months.—1st. prem. $10, S. H. Clay, Paris, Ky.; 2nd. prem. $5, E. Driggs & Wood, Adrian, Mich.

Sow, 2 years and under.—1st. prem. $20, C. Snoad, Joliet, Ill.; 2nd. prem. $10, E. Driggs, & Wood, Adrian, Mich.

Sow, 1 year and under 2.—1st. prem. $20, S. H. Clay & Co., Paris, Ky.; 2d. prem. $10, E. C. Cunningham, St. Charles, Mo.

Sow, 6 months and over.—1st. prem. $20, E. Driggs & Wood, Adrian, Mich.

Sow, under 6 months.—1st. prem. $10, S. H. Clay, Paris Ky.

ALL CLASSES.

Boar, 2 years and over.—1st. prem. $20, J. S. McCreary, Canton, Ill.; 2d. prem. $10, Shepard & Alexander, Charleston, Ill.

Boar, 1 year and under 2, (6 entries).—1st. prem. $20, Shepard & Alexander, Charleston, Ill.; 2d. prem. $10, S. Stratton, Litchfield, Ill.

Boars, 6 months and under 1 year, (6 entries).—1st. prem. $20, Dr. B. L. Stephens, Bridgeton, Mo.; 2nd. prem., $10, C. January, St. Louis.

Boar, under 6 months, (7 entries).—1st. prem. $10, J. S. McCreary, Canton, Ill.; 2nd. prem. $5, E. C. Cunningham, St. Charles, Mo.

Sow, 2 years and over, (9 entries).—1st prem. $20, Shepard & Alexander, Charleston, Ill.; 2nd. prem. $10, J. S. McCreary, Canton, Ill.

Sow, 1 year and under, (4 entries).—1st. prem. $20, J. S. McCreary, Canton, Ill.; 2nd. prem. $10, Shepard & Alexander, Charleston, Ill.

Sow, 6 months and under 1 year, (9 entries).—1st. prem. $20, C. Snoad, Joliet, Ill.; 2nd. prem. $10, J. S. McCreary, Canton, Ill.

Sow, under six months, (6 entries).—1st. prem. $10, J. S. McCreary, Canton, Ill.; 2nd. prem. $5, Dr. B. L. Stephens, Bridgeton, Mo.

SWEEPSTAKES.

Best Boar, any age or breed, (29 entries).—1st. prem. $25, J. S. McCreary, Canton, Ill.

Sow, of any age or breed, (29 entries).—1st. prem. $25 C. Guitar, Columbia, Mo.

Best Breed Sow, not less than 6 pigs, (8 entries).—1st. prem. $20, J. R. Craig, Edmonton, N. Y.

Berkshire Boar, premium by J. J. Roe, (16 entries).—1st. prem. $100, J. R. Craig, Edmonton, N. Y.

Best Sow, Ames premium.—1st. prem. $100, J. R. Craig, Edmonton, N. Y.

Ten Pigs, under 6 months, Ashbrook premium, (17 entries).—1st. prem. $100, C. Guitar, Columbia, Mo.

Fatted Hog, for packing, Fagin & McQueen premium.—1st. prem. $100, Fort, Senter & Co., Erie, O.

Best Chester White Boar and Sow, with litter of pigs, Fletcher's premium.—1st. prem. $100, J. S. Berry, Sappington, Mo.

SWEEPSTAKES BY SUBSCRIBERS.

Boar and Sow, any age or breed, with 5 pigs, same breed.—1st prem. $500, J. R. Craig, Edmonton, N. Y.; 2nd. prem. $250, G. N. Bedford, Paris, Ky.

ESSEX.

Boar, 2 years and over.—1st prem. $20, W. W. Henderson, St. Louis county; 2nd. prem. $10, E. Driggs & Wood, Adrian, Mich.

Boar, 1 and under 2.—1st prem. $20, E. C. Cunningham, St. Charles, Mo.; 2nd prem. $10, Driggs & Wood, Adrian, Mich.

Boar, 6 months and under 1 year.—1st. prem. $20 Driggs & Wood, Adrian, Mich.

Boar, under 6 months.—1st prem. $10, W. W. Henderson, St. Louis county; 2nd. prem. $5, E. C. Cunningham, St. Charles, Mo.

Sow, 2 years and over.—1st. prem. $20, Driggs & Wood, Adrian, Mich.; 2nd. prem. $10, Driggs & Wood, Adrian, Mich.

Sow, 1 and under 2 years.—1st. prem. $30, E. C. Cunningham, St. Charles, Mo.; 2nd. prem. $10, Driggs & Wood, Adrian, Mich.

Sow, 6 months and under 1 year.—1st. prem. $20, Driggs & Wood, Adrian, Mich.; 2nd. prem. $10, E. C. Cunningham, St. Charles, Mo.

Sow, under 6 months.—1st. prem. $10, Driggs & Wood, Adrian, Mich.; 2nd. prem. $5, E. C. Cunningham, St. Charles, Mo.

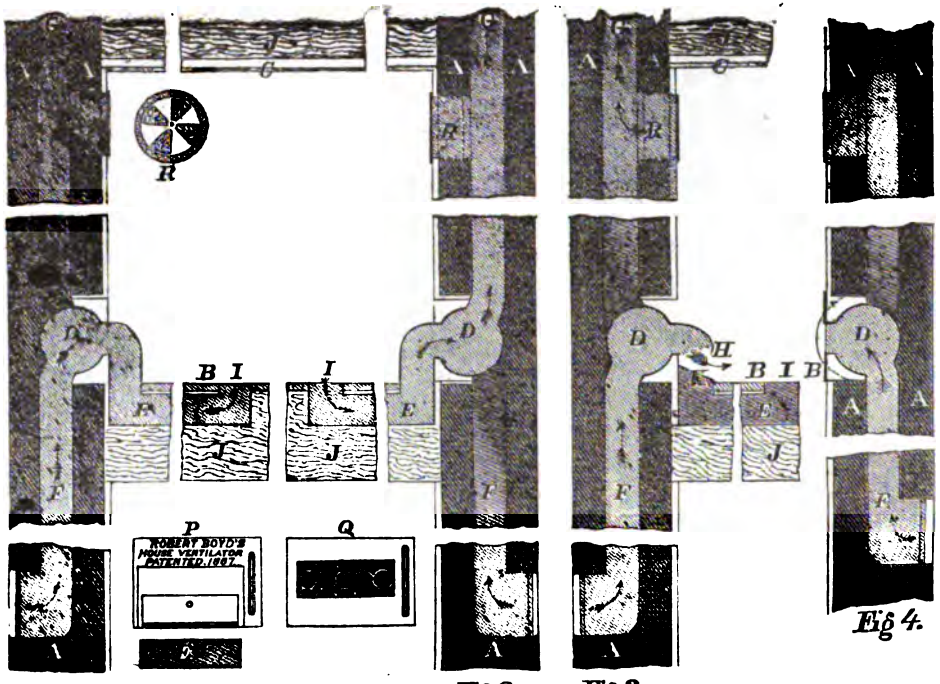


Fig 1. Fig 2. Fig 3. Fig 4.

DESCRIPTION.

FIG. 1—Represents the fresh air entering the room through the floor-duct, and the foul air escaping at the ceiling.

FIG. 2—Represents the stagnant air escaping through the floor-duct, the Register at the ceiling closed.

FIG. 3—The same as No. 1, with the floor-duct shut off by the damper.

FIG. 4—Represents the Ventilator without the floor-duct.

A—Brick wall, with a flue 4x12 inches in the centre, opening outward at the bottom.

B—Floor of Room.

C—Ceiling of Room.

D—Section of Ventilator.

E—Air-duct under the floor.

F—Flue to admit fresh air into the room.

G—Flue to carry off foul air from the room.

H—Damper in air-duct.

I—Register in floor.

J—Floor-joists.

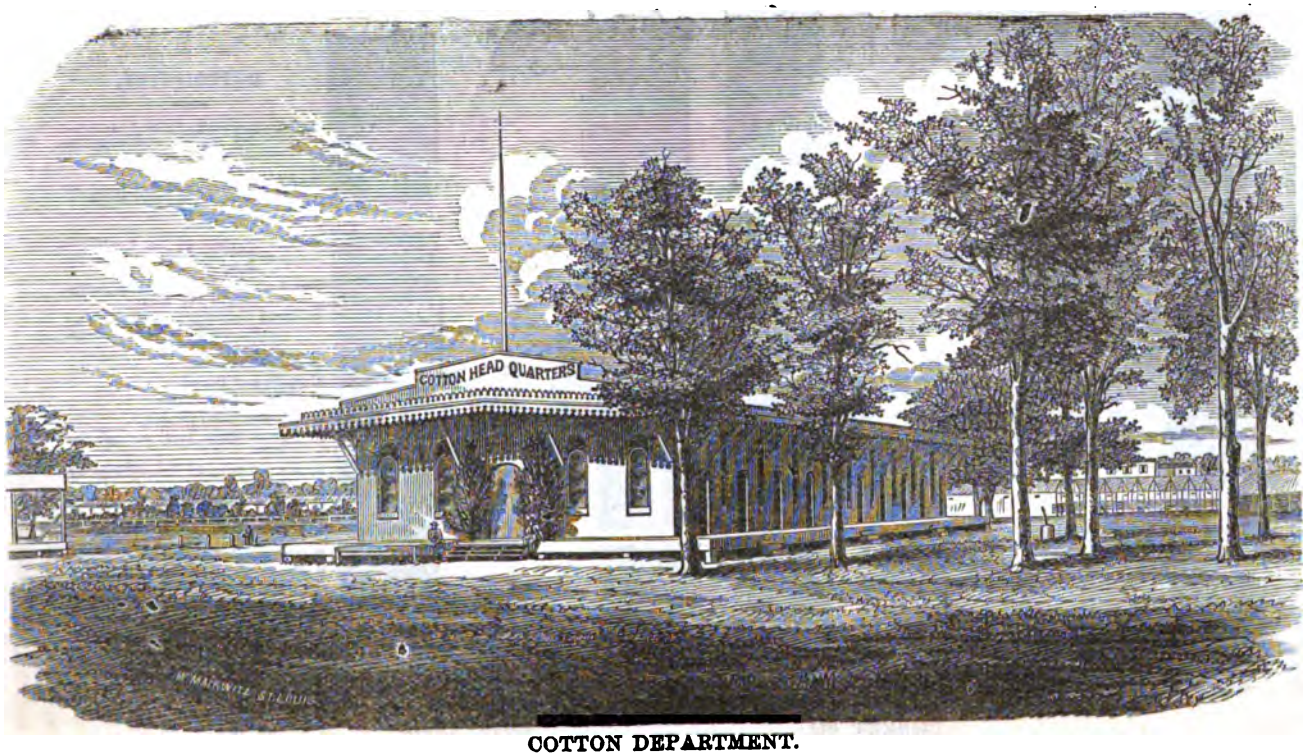
K—Damper closing air-duct (FIG. 3).

P—Front view of Ventilator, with air-duct attached.

Q—Front view of Ventilator without air-duct.

R—Air Register in wall near the ceiling, in foul-air flue.

ROBERT BOYD'S PATENT HOUSE VENTILATOR.



COTTON DEPARTMENT.

COTTON DEPARTMENT.

MILES SELLS, SUPERINTENDENT.

The Cotton Department more clearly than any other demonstrates the national, if not the cosmopolitan, characteristic of the St. Louis Fair. This fleecy staple—this vegetable snow, as it is sometimes called when seen whitening the broad savannas of the South—has exerted a wonderful influence over the commercial and financial affairs of the world. So great was its power, and so vast the multitude of its subjects, that it was christened, if not anointed, KING COTTON. If its intimate connection with all our domestic wants and comforts, and its direct bearing upon the interests of manufactures, commerce and navigation, entitle it to a royal name, as well as royal prerogatives, then it is aptly named.

Cotton was known long ago in several portions of the Eastern Continent and the East Indies. In Hindostan it was largely cultivated and laboriously manufactured centuries ago. In America cotton is indigenous, and the southern portion of the United States is admirably adapted to its profitable production; the short staple growing upon the uplands, and the long staple and Sea Island, upon the Atlantic coast and the adjacent Islands.

Light first came from the East—agriculture, arts, manufactures, science, religion, law, all followed the course of the sun. But now the law is changed, and a reflex wave of light is borne back from the New World to the Old, and far across that continent to the utmost bounds of the Orient. Arkwright's "Spinning Jenny," and Whitney's "Cotton Gin," with other mechanical inventions, have revolutionized the manufacture of cotton goods, and pushed the product of English and American looms, by hundreds of cargoes, into the ports of India. Good machinery went into competition with the cheap labor of Hindostan, and has come out victorious. The poorest pariah in that great country can no more afford to weave his own coarse raiment than the American house-wife can afford to weave her sheets and table cloths. Iron fingers are cheaper than the bone and muscle, even of slaves.

The cotton crop of the United States has increased from almost nothing, half a century ago, to most gigantic dimensions. The crop

for 1870 reached the enormous quantity of 3,800,000 bales, being larger than in any previous year, except that of 1859. The war operated as a serious, almost fatal, check to Southern industries, but the return of peace—in spite of all drawbacks and hinderances—will soon restore this vast and fruitful region to more than its original prosperity.

A large portion of our cotton crop finds a market in England, France and other manufacturing countries of Europe. Much too small a portion is manufactured at home. In this way we pay a large amount every year for cotton fabrics made in Europe from the staple exported from the Southern States.

STATES REPRESENTED.

The large premiums, amounting in the aggregate to $10,000, offered by the St. Louis Fair Association, naturally excited much interest amongst Southern cotton growers, and the consequence was a fair representation from nearly all the Southern States. North and South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Tennessee, Arkansas, were all there in force, with some fine samples from Southern Missouri, and from the Indian Territory. Here come the sample bales that represent a product worth $300,000,000, and they come from every State where cotton is raised.

The Cotton Department of the Fair owes its existence and success to the energy and liberality of some of our leading merchants and business men, who contributed freely to make up the splendid premiums offered by the Association. Amongst the enterprising gentlemen who took the lead in this matter, Mr. Miles Sells, the Superintendent of the department, deserves special commendation. He labored for the accomplishment of this object with untiring zeal and energy, and now, together with those associated with him, enjoys the satisfaction of seeing the cotton department one of the most prominent and important features of the Fair.

If the creation of this department had only added additional glory and success to the great exhibition, it would have been well enough, but still a comparatively small matter. But this is the very least of the great benefits derived from its establishment. The cotton premiums and the cotton exhibitions have brought St. Louis into the closest social and trade relations with a vast and rich country, larger in extent than the original thirteen States of the American Union. Thousands of the leading citizens of the South come to our great annual festival, mingle with our people, form ties of friendship and consanguinity, discover that St. Louis is the great central emporium and trade mart for the valley of the Mississippi, purchase supplies of grain, meat and manufactures, and pay for them with shipments of cotton. Thus St. Louis is becoming a cotton mart of no mean pre-

tensions, and when our iron fingers reach Texas, another vast and productive field of internal trade will be opened to this city. The receipts of cotton in St. Louis during the year 1871, amounted to 41,572 bales, against 11,372 bales in 1870.

COTTON MANUFACTURES IN ST. LOUIS.

The new and earnest spirit that has lately manifested itself in St. Louis, upon the subject of manufactures, embraces cotton as well as iron. We have already a number of cotton mills in successful operation, and proper energy and enterprise will soon demonstrate the fact that it is more economical to manufacture here a large portion of cotton fabrics used in the West and Southwest, than to pay double freight, commissions, insurance, manufacturers' and merchants' profits, on cotton sent to New England and returned to us in cotton cloths and yarns. Thus this new feature in the Fair will increase the manufactures as well as the trade of St. Louis.

ATTENDANCE AT COTTON HALL.

The interest at Cotton Headquarters commenced the first day of the Fair, continued to increase from day to day, and finally culminated in a grand banquet on Friday afternoon. The number of bales on exhibition exceeded the entries of the previous year; and this in spite of the low water and other hindrances that prevented a large number of bales from arriving in time. While the bales of cotton themselves were not particularly interesting to the sight-seeing multitude, Cotton Hall was made a place of peculiar attraction, by the courtesy of the gentlemanly Superintendent and his associates and assistants. The Cotton parlor was always a delightful resting place for both gentlemen and ladies, who were weary with toiling through moving crowds of people, all busy in sight-seeing.

On Friday morning the labors of the sampling and awarding committees were closed, and the report of the latter was ready to be announced. Then came the great feast, attended by several hundred guests, a majority of them from the Southern States. The happiest sentiments of fraternity and reunion were warmly expressed and applauded; and the occasion rose far above an ordinary banquet in its direct bearing upon the mutual interests and relations of the West and South. Appropriate speeches, full of eloquent thoughts and friendly sentiments, were made by Gov. Brown, of Missouri, Mayor Brown, of St. Louis, Hon. C. C. Langdon, of Mobile, A. W. Mitchell, of St. Louis, Col. Hatch, of Hannibal, Mo., Rev. M. Marshall, of Vicksburg, Hon. Jas. S. Rollins, of Missouri, President A. B. Barret, Hon. E. O. Stanard, and others.

MEETING OF SOUTHERNERS.

The influence of the cotton premiums, and the sentiments of our Southern neighbors, are well shown in the proceedings of a meeting held at the Southern Hotel, at the close of the Fair, and described as follows:

The cotton delegation of the great cotton States met yesterday morning at 10 o'clock, in parlor No. 2 of the Southern Hotel. Col. R. B. Hurt, of Tennessee, Chairman of the Cotton Executive Committee, called the meeting to order, and on his motion, C. C. Langdon, of Mobile, Ala., was appointed Chairman. S. A. Jonas, of Aberdeen, Miss., was chosen Secretary, and John G. Palm, Esq., of Texas, was named Assistant Secretary.

The Chair stated the object of the meeting was to make a suitable expression of the obligations due to the Fair Association and the people of St. Louis, for the hospitalities extended to them.

On motion of Marshall J. Smith, of Louisiana, the following gentlemen from the several competing cotton States were selected as a committee to draft resolutions expressive of the sense of the Southern delegation relative to their treatment at the Fair, and during their sojourn in the city: Jesse Huffman, Mo.; Col. Marshall J. Smith, La.; Col. R. B. Hurt, Tenn.; J. F. Arnett, Ark.; B. E. Reese, Ga.; Geo. A. Gutler, Texas; John W. Clarke, N. C.; E. B. Briggs, S. C.; E. G. Carew, Ala.; Col. Watts Gibbs, Miss.

A recess was taken, and on the return of the committee the meeting was called to order, and the following resolutions were reported and unanimously adopted:

RESOLUTIONS.

Resolved, That for ourselves individually, and in behalf of the people of the cotton growing States whom we represent, we tender to the St. Louis Fair Association and the merchants of St. Louis, our grateful acknowledgments for the munificent encouragement extended by them to the promotion of the great staple of the South.

Resolved, That the award of $10,000 in cotton premiums is an act of liberality unparalleled in the history of American Fairs, and we hail it as an evidence of a just appreciation on the part of the people of St. Louis of the importance of more intimate business and commercial relations between the West and South.

Resolved, That we cordially tender our warmest thanks to the Fair Association and the people of St. Louis generally, for their unbounded hospitality and unremitting attentions of which the representatives of the South have been the recipients during our sojourn in their beautiful and growing city.

Resolved, That our thanks are especially due, and are hereby cordially tendered, to Miles Sells, Esq., Chairman of the Cotton Association, and the other officers and managers of the Cotton Association for the fairness with which the cotton department has been conducted, and their unremitting attention and whole-souled hospitality.

Resolved, That we shall carry with us to our Southern homes a most grateful and pleasing recollection of our present visit to St. Louis, and trust the day is not far distant when the West and the South shall be commercially, socially and politically one and indissoluble.

Hon. Geo. A. Cutler, of Texas, moved the following, which was unanimously adopted:

WHEREAS, The Cotton Committee, consisting of gentlemen from the various Southern States, being fully impressed with the importance of the cotton department of the St. Louis Agricultural and Mechanical Fair, and deeming this, as we do, one of the most efficient and substantial means of cementing the brotherhood of the two sections of our country.

Resolved, That in the event of a similar exposition at the next annual Fair o this Association, we pledge our united efforts to the furtherance of the enterprise, and will do our utmost to secure the greatest number of exhibitors from the States we represent, and impress our people with its vast importance.

PREMIUMS AWARDED.

The following were the awards:

Arkansas.—Best bale, $500, Thomas H. Farmer and Sisters; second best bale

$250, W. J. Gizzard, Augusta; third best bale, $100, W. W. Ford, Chicot Creek.

Alabama.—Best bale, $500, W. Harris, Franklin county; second best bale, $250, E. B. Brown, Pine Grove; third best bale, $100, Dr. Ed. Ashford, Portland.

Mississippi.—Best bale $500, W. B. McShan, Verona, Lee county; second best bale, $250, Ed. F. McGehee, Connor county; third best bale, $100, W. B. McShan, Como county.

Tennessee.—Best bale, $500, Thee Wesnolan, Giles county; second best bale, $250, Mrs. Lucy A. Miller, Bartlett, Shelby county; third best bale, $100, W. T. Dood, Woodville.

South Carolina.—Best bale, $500, R. H. Henderson, Society Hill; second best bale, $250, E. J. Meens, Winsboro; third best bale, $100, Frank E. Taylor Charleston.

Texas.—Best bale, $500, G. T. Ross and C. Krones, San Phillip; second best bale, $350, L. H. Ogburn, Chapel Hill; third best bale, $100, Wilson Peers, Ryan.

Louisiana.—Best bale, $500, G. Gibson, Waterproof; second best bale, $250, Iverson G. Gaydon, East Felicina parish; third best bale, $100, Adam Kellogg, Nichols Place, Madison parish.

Georgia.—Best bale, $500, no premium, second best bale, $250, J. F. Marshall, Talbott county; third best bale, $100.

Missouri.—Best bale, $500; O. F. Summers, Dunklin county; second best bale, $250, W. C. Hunter, New Madrid county; third best bale, $100, H. M. Carman, Dunklin county.

North Carolina.—Best bale, $500, N. A. Bareford, Black Creek; second best bale, $250, Calvin Woodward, Wilson county; third best bale, $100, Britton Forbes, Wilson county.

Miscellaneous.—Best bale of cotton raised from Peeler, Dickson, Silk Lace, or any improved seed, $500, awarded to R. A. Ware, of Lee county, Missouri, on Long Staple.

Sweepstakes.—Best bale of long or short staple cotton raised in any State, $1,000, awarded to W. B. McShan, Lee county, Miss.

For the best plan of levee making, diploma to G. Brawner, Frankfort, Ky.

The advantages of Mr. B.'s plan are thus stated:

1st. It is cheap.

2d. It will protect the embankment against the effects of crawfish and other borers.

3d. It will protect the embankment against seepage.

4th. It will prevent the current from cutting the embankment, in case of a sudden rise.

5th. It is a protection against quicksilver and other similar means employed by vicious persons.

6th. If the levee should be cut, it can be readily repaired.

7th. In case of an unusual rise in the waters, the embankment may be readily raised, the posts being already firmly planted and extending above the surface.

Mr. McShan, who received the sweepstakes premium, was called for, and appearing on the stand, he said he was not an orator. If he was he would give them an harangue, and another premium bale to quit.

Mr. Miles Sells, the Chairman of the Association, then offered some brief remarks, making handsome acknowledgment to those who contributed to the Cotton Fair.

He said that for the beautiful manner in which this building had been decorated we are indebted to ex-Senator J. M. Jordan, Capt. N. Wall, Capt. J. H. Conn, Capt. Monson, and especially to Capt. Wall. For valuable aid in raising the ten thousand dollars you must feel under lasting obligations to John T. Watson, Geo. Fisher, D. N. Marmaduke, James A. Gregory, Mr. Maud, Samuel Richardson, Hon. A. W. Mitchell, Pitt Rowland, Richard Scruggs, Mr. Senter, Joseph Imbs, and many others.

To the boatmen, who are always ready upon all great undertakings, you must feel under the greatest obligations, and here let me tell you the names of those who should be written high on the roll of honor: Capt. John A. Scudder, President Memphis Packet Company; John Boffin-

ger, N. O. Packet Company; John F. Baker of the Southern Line; James A. Jackson, of the Arkansas Packet Company, and Carter & Conn, of the Red River Company; also to Graham & Co., Overland Express to Texas.

To Thomas Allen, President Iron Mountain Railroad, and Geo. H. Rea, President of the Barge Line. Last, but the greatest of all, has been the united help of the press. The newspapers of our city are always foremost in all the greatest enterprises of the day, and to them the contributors of this magnificent premium and the officers of this Fair owe more to than to all else.

Three rousing cheers were then given for the great staple.

THE AMPHITHEATER.

FIRST DAY—MONDAY.

Auspicious morning, hail! The heavens smile, the earth is glad. Nature has just completed another of her great cycles, from the dead seed in the cold fallow, through the buds, blossoms, birds and butterflies of Spring, and the rich fruitage produced by Summer showers and Summer heats, until her work is consummated in the glorious fruition of a luxuriant Autumn harvest. What better time to hold a grand festival of agriculture and the kindred arts? The St. Louis Fair is this festival; not for a city, county, district or State, but for the great empire of the West. It began in feebleness some sixteen years ago, but the first efforts were crowned with success, and the originators of the enterprize being among the liberal and public-spirited citizens of St. Louis, determined to prosecute the good work, so auspiciously commenced, onward and still upward, to a higher point of success. The stockholders invested their money, not to get dividends, but to build up a noble institution. The same sentiment has prevailed to this time.

The Association has never declared a dividend, and never expect to. All the money accumulated from stocks, gate fees, rental of booths, etc., goes at once into a fund for improvements. The last ten years have seen the grounds increased in area almost to one hundred acres, and nearly one hundred thousand dollars expended in new buildings and other important improvements.

This liberal policy of the Association has met with an equally liberal response from the people of the Great West. The Fair has grown with the city that inaugurated it, and now its legitimate field of influence is over the twenty great States and Territories, whose trade finds a natural center in St. Louis. But outside of this vast district, the St. Louis Fair has exhibitors and visitors from every State in the Union, from the Dominion of Canada, and from Europe.

The present Fair is already stamped with the seal of a great success. The entries and exhibitors are greatly in excess of any former year. Visitors by the thousand are pouring in by every train and steamer, and no one doubts that this will be the most brilliant triumph in the history of the St. Louis Fair.

GENERAL ARRANGEMENTS.

Not only has the dust business been well attended to, but the various appointments of the grounds, external and internal, have undergone careful revision and improvement, leaving little or nothing to be desired. The magagement seem to fully realize the present magnitude and rapid growth of the institution under their charge, and are determined to keep pace with it by supplying all necessary adjuncts. Of course, there are, and must be, some minor deficiences, which develop themselves from year to year; but these, as they become apparent, are always rectified; and so each returning Fair is not merely more ample in its proportions than its predecessor, but in all respects more enjoyable to those who participate.

THE MISSING CHILDREN.

Last year an arrangement was made by which the children of the public schools were allowed to visit the Fair on Monday, and their presence aided materially in enlivening what is generally the dullest day of the week. None who saw the amphitheatre crowded with merry boys and girls, heard their ceaseless tramp around the corridors, and shrill, tumultuous shouts saluting the four-footed conquerors in the ring, can forget the impressions conveyed, or fail to regret that it was lacking yesterday. President Barret, renewed his proposition this season, and offered to admit free all children under fourteen, but the school authorities declined to suspend their exercises before Thursday, and the result was that comparatively few of the little people were visible.

ADDRESS OF HON. JAS. S. ROLLINS.

At half past two o'clock the Hon. Jas. S. Rollins, the orator of the day, was introduced by Senator Schurz, from the Director's box, and proceeded to deliver the following address:

MR. PRESIDENT, LADIES AND GENTLEMEN: I appear before you at the invitation of the "St. Louis Agricultural and Mechanical Assotion," to speak to you of the great interests which the exhibitions of this Association are designed to promote for the good of all. And I ask your indulgence, when I say, I am highly honored, and that I take more than ordinary pride in this occasion.

Forty-one years ago I came to this State. My young heart throbbed with energy, and I was cheered with the inviting prospects which the great West opened up to the enterprise and ambition of American youth. All this vast country was frontier. The marks of civilization were scarcely to be seen, where now man has carved mighty States from the wilderness, and ornamented the land with thriving and populous cities.

The State was in its infancy, and St. Louis was but a small town. Steam was scarcely known upon the river, nor school-houses upon the land. What a wonderful change? A great tidal wave of civilization has moved over the country, and the wilderness has been changed into fruitful fields, and the pleasant habitations of civilized men. I have stood upon the soil of Missouri, and witnessed it all; seen the moving panorama of human progress; the pioneer dispute with the savage and buffalo their empire over nature; this city grow from a village to a great commercial metropolis; I have seen the well-fashioned steamer come to your levee, to do the bidding of commerce, and with many of the elder inhabitants have welcomed the railway, and the electric telegraph. We have seen this great Fair born into existence, and have felt supreme delight in its good management, and the fine influence which its splendid exhibitions from year to year were having upon all the industries of the Mississippi valley, and of our great country. All honor to the worthy officers and members of this Association. The movement of all things is onward. There is a growth to nature, as there is a growth to the vine and the oak. There is a growth to civilization, as there is a growth to man. Modern civilization utilizes the arts, and constantly tends to direct the intellect of man to more practical purposes in the affairs of life. Our age is in advance of the age of Codrus and Caligula; our Washington may be reckoned a prototype of Cincinnatus; we are in advance of Phidias and Parrhasius, if not so much in the genius, we are in the spirit, in the better purposes. Egypt rudely carved upon stones, and had a language without literature. We print by steam, and embellish the land with literature and art. Egypt worshipped the ox in his sluggish toil; we aspire to know the infinite. Greece had her Olympic games and Rome her Amphitheatre; we have our great expositions of art and industry. Egypt had her pyramids; the nineteenth century has its crystal palaces.

This character of exposition dates back many centuries. It grew out of the market system, and is still a branch of that system of traffic with productive industry. It was instituted by the people of Europe and China, first as a branch of the common markets, for the purpose of procuring the best of the various products of the country. But it became a separate system, an exposition for the sale of the most valuable and choice of the products of the land, and amongst many people was held twice a year. They were also for a time under the control of the churches, and the patronage appropriated to their benefit, after the manner of our sanitary fairs, held for special purposes. In time these fairs were separated from the markets, and personal and public interests attached to them features of a wider range, and they are now organized and maintained for that highest of all good, the public good.

And while there is still attached to them that ancient characteristic of the market, their better purpose is to stimulate and encourage agricultural pursuits, the mechanic arts, and the universal industry of man. What effort can be greater? what exposition more useful? Let us consider this. Agriculture! the science which explains the art or means of cultivating the earth. It lies at the very base of human society. When man awoke into being he soon found that he was a creature of growth, like the animals over which he was given undisputed ownership, and that to grow he must supply his system with food. And not only did nature demand this, but she also provided the means, and bade him go forth to the fields and forests, and in the sweat of his face eat bread all the days of his life. This compelled him to labor, and to search after the plants and the fruits; and he gathered from them such as would afford him food and raiment, and commenced their cultivation. He gathered them from northern latitudes and tropical climes, and as his intellect developed and his wants increased, he multiplied their variety and value. Thus agriculture may be said to have taken its rise almost cotemporaneously with the birth of man. We trace it in hieroglyphics and read of it in song.

The early civilization of Egypt furnishes the first evidences of distinctive agriculture. The fertile valley of the Nile has from the earliest ages known to man been a region of fruitful agriculture, and supplied sustenance to millions of human beings from time immemorial. Egypt was also the birthplace of the mechanic arts. The ruins of Thebes exhibit columns, statues and fabrics of stone curiously wrought with the chisel, and there is reasonable evidence that the inhabitants of Thebes were acquainted with iron and the making of edged tools, as well as working in wood. They are known to have used wheeled carriages, and constructed machinery, and to have cultivated the earth by plowing. In short, Egypt was not only the birthplace of agriculture and mechanic arts, but also the cradle of civilization, and the mother of many. mysterious doctrines that have ruled mankind in every age.

Agriculture as a means to supply the wants of man, has grown with the multiplication of the race. But as a science it is still in its infancy. For although all the known plants in the world, and "herbs bearing seed" for food, and the trees bearing fruit have been named, and their uses prescribed and appropriated by man, he has not yet with a fullness of wisdom, comprehended their secret wants, whereby to enable them to yield the greatest bounty, nor adjusted his labor to acquire from them the greatest profit.

As far as mechanical forces can be utilized and applied to the interests of agriculture, the motive for gain has compelled the application. And when we look around us, and study the inventions

and the vast array of improvement for the cultivation of the soil and the gathering in of the crops, it would seem that man had almost perfected his work. But, when we look deeper, and examine into the secret mysteries of vegetable life, its requirements and improvements, we find that although our knowledge is great, we are but little in advance of primal principles, and that what we know is but experimental and fragmentary. Hence as a science agriculture is still in its infancy. The profession of agriculture and the mechanic arts has not attained that influence and respectability, in the opinions of men, to which is is justly entitled, on account of its intrinsic worth and great utility. There are many who are highly cultivated and refined who move in the higher walks of life, but who have a poor appreciation of the real value and respectability of the "toiling millions," and of the heavy debt which society must ever owe to them for all the comforts of life which we are permitted to enjoy. Without them our whole country, smiling in beauty and bringing forth its annual treasures of grain, and fruits, and sweet-scented flowers, would lapse into a barren waste; our commerce would languish; our manufactories would dwindle, and our towns and cities would cease to grow. These at least constitute the solid foundations upon which all private and public prosperity must forever rest. They are the architects to whom every government and country owe their prosperity and strength amongst the nations of the earth. Aided by science, with their strong arms and willing hands, they develop all our resources in time of peace, and they are our bulwarks and sure defenders in time of war.

And this leads us to consider briefly the dignity which belongs to the pursuit of agriculture. The illustrious *Franklin*, whose eulogy was conveyed in such felicitous language by the eloquent *Mirabeau*, when he said "He snatched from Heaven its thunderbolt, and from the tyrant his sceptre," that great American sage, whose fame shed lustre on the age in which he lived, and who held toward his country the envied relation combined of mechanic, patriot, statesman and philosopher, pronounced agriculture "*the most honorable of all employments being the most independent.*" "The farmer," said he, "has no need of popular favor, nor of the favor of the great: the success of his crops depending only on the blessing of God and his own honest industry." The occupation of the farmer is not only honorable as being the first pursuit of man, and as having engaged the attention of the most virtuous and illustrious men of every age, but it is the most honorable for the precise reason given by Franklin. It is the most independent of all pursuits of man. The merchant depends upon the farmer and manufacturer; the mechanic upon the farmer and merchant, and the professional man upon all of them. But Franklin, as well as the experience of ages, proclaim

that the farmer is independent of all save the "blessing of God and his own honest industry."

Gentlemen farmers: allow me to appeal to your pride of character, to your patriotic feelings and patriotic energies, by addressing to you the language once applied to your profession by one of the ripest scholars and ablest financiers this or any other country has produced: "It may not be foretold," he said, "to what dangers the country is destined, when its swelling population, its expanding territory, its daily complicating interests, shall awaken the latest passions of men, and reveal the vulnerable points of our institutions. But, whenever these perils come, its most steadfast security, its unfailing reliance will be on that column of landed proprietors, the men of the soil and of the country, standing aloof from the passions which agitate denser communities, well educated, brave and independent, the friends of the government without soliciting its powers, the advocates of the people without descending to flatter their passions. These men, rooted like their own forests, may yet interpose, between the factions of the country, to heal, to defend and to save." There is a dignity in the agricultural and mechanical professions truer and nobler than in any other works of life, however gilded with classics or honored with titles. The independent farmer honestly and bravely gathering his fruits and his flowers, from the fields and forests of his own cultivation, is nearest to nature. And he who is nearest to nature is nearest to God. The sweet songs of Burns exhibit as true poetry and as fine genius, although conceived and written by him when an humble follower of the plow, as ever emanated from oriental lands, or from minds richly imbued with classic literature. It is said by some philosophers that there is no real wealth but the labor of man. Agricultural products are nearer to labor than any other form of product which the labor of man brings into use. Man's primal necessities are food, clothing and shelter. These come from the farms and the forests. Nor is it the statement of a hackneyed sentimentalism—that the greatest happiness of man *is* found in the quiet abodes, where he obtains from beneficent nature his primal necessities. By no means. It is a truth which has been recognized by the wisest and best men in all ages. It was no aphorism, no scouting of distinction or rank that led the elder Cato to the farm, nor directed the Roman mind to call Cincinnatus from the plow to the rulership of the empire. It was no immodesty that partook in any degree of selfish pride that led Washington and Madison, Clay and Webster, and other distinguished statesmen and philosophers of our own land, to seek the quiet retreat of a country home, where

"The groves were God's first temples."

Nor is it an impulse of excentricity that induces the emperor of China to go from his imperial castle once a year to the fields, when the laborers first go out at the opening of the new season. Rather is it the wise and patriarchal nature and superintending care for the welfare of his empire and people that cause him to go to the fields and guide the first plow with his own hand, and thus dignifying agriculture by his imperial presence, and by turning the first furrow give sanction and encouragement to those who toil in the fields.

The mechanic arts took their rise with agriculture; in fact, in Egypt, they were in the advance. Many were the contrivances of the ancients in mechanical industry, which was constantly stimulated by an effort to do more, and utilize time and opportunity. The history of the world shows, strange as it may seem, that agriculture is the last department of industry in which improvements have been made, and when made, they have been in most cases, only new applications of some mechanical power, or instrument previously used. And, although necessity and a desire for gain has ever, though slowly, stimulated the growth of agricultural products, the mechanic arts have steadily kept in advance. Men, by some strange impulse of nature, have constantly sought to discover some new principle of science, or some new mechanical force, and in utter indifference whether the world would be supplied with food for the coming year. And yet there is no department of human industry upon which the welfare of men so much depends. Without success in agriculture, commerce would remain stagnant. A few marines, half civilized, might live upon the islands of the sea, or the coast lands of the continent, subsisting upon fishes and tropical fruits, and savages might roam through the interior in search of game. But civilized men have worked the soils and metals until agriculture gives food to the world, and makes the land and the ocean rich with commerce, whilst the inventive genius of our race has combined mechanical forces into such a wonderful system of uses, as to save labor, economize time and industry, increase production, and add largely to the profits of human effort.

Yet fruitful and exhaustive as are the lands, and willing and enured to toil as man may be, there is no department of human labor that so much demands improvement by special education as that of agriculture. "Book farming," so lightly regarded by many, is a most valuable and important adjunct in the advancement and improvement of the profession. It is in the college and chemical laboratory that soils are properly analyzed, their constituent properties made known, and proper combinations and substitutes made, which will insure the largest production of any given crop. It is equally in studying carefully the physiology and anatomy of the various breeds of stock, such as we find in scientific books and jour-

nals, devoted to agriculture, that enables the farmer to make such crops as in the end will esure the greatest perfection, and the largest profits. It is this thorough investigation by scientific men, united with a practical knowledge of agriculture, and the growing of stock, that has converted land worn out and given to waste into fruitful fields; substituted the Berkshire, Chester Whites, Poland Chinas, and the various other improved stocks of hogs, from the fearful mud-splitters of the prairies; the magnificent Durham, from the heavy-horned and gaunt Texan ox; the fleet and blooded racer, the fast trotter, and the muscular and powerful draft horse, for the Indian pony and wild horses of the plains; the fine merino wool and delicious Southdown mutton, for the coarse fleece and still coarser mutton produced in New Mexico.

The same laborious investigation and observation, by cultivated scientific men, united with large practical experience, have provided the same gratifying results in reference to all other domestic animals and fowls, and the same careful study, and the application of known scientific principles, have produced equally gratifying results in the successful growth of trees, and of plants, of fruits and of flowers, of grains and of grasses, until during the last twenty years there has been almost an entire revolution, both in the quantity and the quality, of the productions of the vegetable kingdom in our country. As an illustration take the culture of the grape. A few years since and its cultivation was almost wholly unknown in Missouri, except by a few enterprising Germans at the town of Hermann, on the Missouri river. Now, through the influence of our State Board of Agriculture, our horticultural societies, our county agricultural organizations, and the earnest and faithful attention given to its production by practical fruitists and scientific horticulturists, and editors of papers devoted to agriculture and horticulture, this healthful and delicious fruit has almost reached perfection of culture, both in variety and quantity. It is brought within the reach and enjoyment of every one. There is scarcely a county in the State whose people are not boasting of the admirable fitness of its soil for the production of the grape. In St. Louis, the present season, the market has been overstocked with them, and at the present rate of production it will be only a few more years when every family will be abundantly supplied with them, and the use of wine and beer (the great preventives of intemperance) will become a substitute for intoxicating drinks, and our people of all classes will be distinguished alike for their frugality, their industry and their sobriety. Already we have in this great city the largest manufacturing wine establishment in the United States. I refer to the "American Wine Company," which, in the present year, has put up 1,120,000 bottles of champagne, besides numerous varieties of other kinds of wine in very

large quantities, and in all respects equal to the wine manufactured anywhere in our country.

What I have said in reference to the improved culture of the grape, is equally applicable to the improvement in the cultivation of every other kind of fruit that grows in this latitude. Missouri is becoming famous, and justly so, as much for the adaptation of her soil to the production of fruits, as she is already noted for her rich and fertile soil, the extent and variety of her wonderful mineral resources, and the healthfulness of her climate. Let us then be careful not to underrate the influence of science and the labors of scientific men for the improvement of agriculture in all its varied departments. I venture the assertion that Leibig, by his profound research and his contributions to science, has added more of real value to the agriculturist and to the commercial value of agricultural products than all those who, in the fullness of their wisdom, have ignored "book farming," and relied wholly upon those practical tests, which under their own observation they were enabled daily to make. He has almost mastered the soils, discovered their constituent elements, and the natural wants of each domestic tree or plant which serves man in the production of food; and he has prescribed the proper use of each for purposes of nourishment and strength, and the preservation of the health of the human system.

Our own late Prof. Mapes contributed vast treasures of knowledge essential to enrich the American farmer, and yet how few comparatively avail themselves of the aid and advantages which science affords them. They toil on in the beaten path, embracing now and then some improvement in the mechanic arts intended for their benefit, and whereby their labors may be lessened, but they are incredulous as to any advantage that is likely to come to them either from the laboratory of the chemist, or from the tests and experiments of the learned professor of agricultural science. This, however, they must learn, and their sons and daughters must be taught that agriculture is not only a means of acquiring wealth, but that it is a science which the better understood is the easier pursued, and in the end returns the largest profits.

The sons and daughters of America must be taught that the dignity of labor is in the simplicity of its performance; and that the *only dignity* there can be in labor, consists in the simple fact of honestly earning one's living. And in this fact lies greater dignity than either crowned heads or wealth can confer. He is "nature's nobleman" who honestly earns what he gets, and wisely toils for the rewards of industry. It is this which honors the *plow*, the *plane*, the *trowel*, and the *anvil*. It is this that enriches the fields. It is this which increases the crops, multiplies the herds, and crowns the farmer with health, with honor, with usefulness, and with glory.

And what obligations and duties rest upon those so favorably located, where such great advances have been made in these departments of human industry? Situated as we are in this land of freedom, and in the very heart of this renowned valley, more fertile than the valley of the Nile or the Amazon, and where nature has been most prodigal in lavishing upon the people her choicest gifts, it becomes us to render to the American people a good account of that which has been entrusted to our care.

Fifteen years ago, in the year 1856, this Association was organized, and held its first Fair. The public press is the great engine of progress. Mainly to the press this glorious Fair owes not only its development, but also even its origin, and doubtless each and every soul mingling in these scenes of pleasure and profit, will join in paying a tribute of honor to the memory of the literary author, from whose heart, head and hand flowed the thoughts which formed the nucleus of this Association. In the tenth volume of the *Western Journal and Civilian*, July, 1853, the senior editor, M. Tarver, published his condensed ideas on "Manufacturing Associations and Industrial Fairs." Being in pamphlet form, the article was read and reread, handed around and considered, until the 7th day of December, 1855, when the embryo reached the period of the enactment of the present charter, after which Hon. J. Richard Barret, with great honor to himself, took charge of the project, organized the association on the 5th day of May, 1856, and in October following, the first Fair was held, offering a premium list of $10,000. Among the various points of argument presented and pressed by Mr. Tarver, the following may be quoted in proof of his keen foresight: "At present, St. Louis is not known abroad as a manufacturing city, and not one in a thousand of her own citizens has a just conception of the variety and extent of commodities produced here. Were specimens of all her varied products exhibited at one view, it would astonish even those best acquainted with the business of the city, and do more to impress upon the minds of the people of the United States a just sense of the future greatness of St. Louis, than all the works of public improvement that have been projected by her citizens."

At that time the population of this great city numbered 125,000 inhabitants, a little more than one-third of its present population. The amount of the premium list for the first Fair was $10,000. At the present one it is $30,000, with an additional cotton premium of $10,000, making an aggregate of $40,000, and which are by far the largest premiums ever offered in any State in the Union. Despite of flood and fire and pestilence and civil war, St. Louis has met with almost unparalleled and substantial growth, and this "Association," under its wise and liberal management, commencing as above stated, and with its original benefactor, the late Colonel John O'Fallon,

whose whole life abounded in gracious and noble acts, intended to promote the happiness and welfare of his countrymen, has kept pace with the rapid growth of the city. Under the successive administrations of its various residents, the Hon. J. Richard Barret, Captain Andrew Harper, Charles S. Todd, Esq., and the present most accomplished and efficient incumbent, the Hon. Arthur B. Barret, its boundaries have been extended, its grounds most tastefully and elegantly arranged and beautified; its buildings made ample for the display of these vast improvements in machinery and in agricultural and mechanical industry, which we here behold; its large and commodious cotton parlor, intended for the accommodation of the rapidly reviving planting interests of the South; its elegantly designed Art Hall, in which to exhibit the trophies of genius; its splendid amphitheater, greatly enlarged, and in which, with fine music and the presence of an hundred thousand people, men, women and children, presenting the appearance of a "fairy scene," are exhibited the graces of the equestrian art, and the improvements made from year to year of our stock of cattle and horses, and other domestic animals; with its shaded groves, its evergreens, its grotto, its artificial lake, its fountains, and its bright flowers, present at once, evidences of progress and improvement, and a scene of enchantment and beauty that might have "charmed Calypso and her nymphs," or that "Shenstone might have envied." But these are as nothing when compared to the good which this Fair has already accomplished in its influence to stimulate and develop the agricultural and mechanical interests and industries of the cities and States of this great valley—I might say of the nation. The value of that good influence exerted by these organizations and expositions upon the social character of our people, and upon all the material interests of the country, can hardly be estimated. Brought together in large numbers by the easy facilities afforded by our railroads, from widely separated districts of country, the intercommunion of the people enlarges their intelligence, softens their prejudices, identifies their interests, stimulates an honorable rivalry in the industrial pursuits of life, and prepares them better for all the duties of good citizenship. American civilization is elevated and advanced. The comforts of life are brought more easily within the reach of all, the inventive genius of our people is kept constantly active in devising other improvements that will lighten the labor of the masses and make them contented and happy in all the various pursuits of life. These awards of premiums so generously dispensed here, give new encouragement and vitality to the farmer, the planter, the mechanic, the artisan, the manufacturer, the day laborer, indeed to all who feel an interest in the progress, and the rapid growth and development of the material wealth of the country.

The beneficial influence of this Association has also been most favorably exerted upon the city of St. Louis, which has within the last few years outstripped any other city of the continent in substantial improvement, and in the growth of its commercial, mechanical and manufacturing interests. Nor is its mission yet half finished. With the growth of St. Louis, and with whose fame it is identified, its influence will expand, and be felt for good in still remoter parts of our country. Side by side they will advance together in utility and greatness, as long as civilized men struggle for the rewards of ambition and toil. And when the spot where we now stand, in the very heart of this fruitful valley, midway betwixt the great oceans, shall have become, it may be the very centre of the world's civilization, the abode of refinement and wealth; the seat of science, of literature and of art, of moral and social elevation, and surpassing the cities of ancient and of modern times, in population, in the extent of its commerce, in its woolen and cotton and iron manufactories; in its mighty structures; its architectural adornments, and the extent of its political power and influence, *this Fair* will be more famous than battle-fields or fallen cities!

But I must be brief—the present moment admonishes us. Behold the beautiful spectacle before us. These thousands of children. The hope of the country, forming the rear guard of the great army of the human race. In a few years at best, the responsibilities of the century will be with them. To them will be entrusted all the sacred interests of society; the preservation of the government; the moral and intellectual elevation of the masses of men who are to succeed us; the cause of material improvement and progress, and of discovery and invention which have distinguished the nineteenth century! Shall these things go backward? Shall they be permitted to stand still? We think not. Under the quickening influences of free institutions, free thought, a free press, a high civilization, the motto of American youth will still be—"Onward! Onward!" From the midst of this vast throng may spring some mind imbued with earnest faith, and other philosophies destined to elevate and bless mankind; some heart "pregnant with celestial fire," preparing to sway the "rod of empire" for the good of our common humanity; some "village Hamden," some "mute inglorious Milton."

> "The applause of listening senates to command,
> The threats of pain and ruin to despise,
> To scatter plenty o'er a smiling land,
> And read their hist'ry in a nation's eyes."

But, to attain the largest development of the material resources of the country, to utilize the bounteous gifts of nature and make them subservient to the interests and happiness of man, to make a nation of freemen, capable of appreciating and maintaining, and transmit-

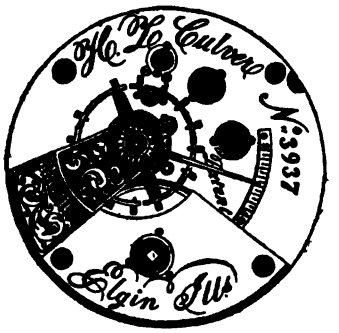
ting republican forms of government, the imperative duty devolves upon the State of so perfecting its educational system as to bring the advantages of education within the reach of every child. We want no aristocracy of knowledge in this country. But regarding every intellect as a part of its wealth, and useful only in proportion to its enlightenment and cultivation, the State should provide ample means for the education of all. Not only should our system of free schools be liberally maintained, but institutions of a higher grade should be established and supported, where the great body of the people, the industrial classes, the farmers and mechanics, might be taught and made familiar with all the later discoveries and improvements in science, and upon a thorough knowledge of which success in their respective pursuits so greatly depend. It was the thought of educating more thoroughly in those branches, applicable to their professions, the working men of the nation, that induced the national legislature to make such liberal appropriations of land for the endowment of "colleges of agriculture and the mechanic arts." They are the colleges of the people. Such institutions are being successfully established in many of the States, and regarding them as not only intended specially, but pre-eminently adapted for the education of those whose purpose in life is the pursuit of agriculture and the mechanic arts, they need and ought to receive the fostering care and encouragement of the industrial classes, and of all organizations founded to advance their interests. Such a system, thoroughly engrafted, and sustained with steadiness and enthusiasm, will add strength to our older literary institutions, and at the same time give opportunities for that larger culture and consequent elevation of the farmers and mechanics of the country, and which they have not heretofore enjoyed. In a government founded upon the popular will, as defined in a written constitution, all should receive equal advantages of education, giving, thus, to those engaged in the practical industries of life the same power in framing the laws, and the same chances of promotion enjoyed by those who are engaged in the learned professions; and giving to them that also of which they cannot be deprived under any circumstances; that which, in the language of the great Roman orator, "nourishes our youth, delights old age, adorns prosperity, affords a refuge and solace in adversity, gives us pleasure at home, is no impediment abroad, is with us during the night, travels with us, goes with us into the country."

Thus fortified, men of every profession and calling having gained that independence which is the sure reward of well-directed labor in this fertile and bountiful country, will be prepared to seek and to enjoy that retreat from the cares of active business life longed for by the good and great in every age. As the weather-beaten mariner

seeks at last a resting place upon the land where to pass in quietude the evening of his days, bringing with him the shells of the ocean and trophies from distant lands, to pave his pathway and adorn his quiet home, so does the soldier and the statesman, the literary, professional and business man in his declining years, retire to his country home and gather around him the treasures of art, and of knowledge, and the trophies of honor. History abounds in illustrious examples of those who, having met the obligations of good citizenship and appropriated the reward of an honorable ambition, have sought that health, and peace and contentment which a life in the country always brings. The elder Cato, Cincinnatus, and Seneca will serve as examples of the olden time. And in our own country, we have the noble example of Washington, honored in every land where virtue and freedom have a votary, in his quiet retreat at Mount Vernon; of the elder Adams, at Quincy; of Jefferson, at Monticello; of Madison, at Montpelier; of Webster, at Marshfield; of Jackson, at the Hermitage, and last, though not least, of Clay, "amidst his flocks and herds, beneath the shades of his trees," at Ashland.

Country life, everywhere, promotes health and independence, virtue, refinement, patriotism and religion, and we may truly say with Byron:

"There is a pleasure in the pathless wood,
There is a rapture on the lonely shore,
There is society, where none intrudes,
By the deep sea, and music in its roar;
I love not MAN the less, but NATURE more."



SEE PAGE 80.

DRAFT HORSES.

DAVID CLARKSON, SUPERINTENDENT.

At 10 o'clock the gates were opened to the entries of draft horses, and the exhibition was not unworthy the pencil of Rosa Bonheur, nor yet unlike the scenes she depicts with such marvelous fidelity; all the more like from the fact that in the first ring there were only animals of unmistakable French descent—the heavy Clydesdales, that have on occasions wrested a hard-won triumph from sturdy Percheron, and Norman representatives, being unrepresented. The display, however, was not in the least behind that of previous years, and of the fourteen horses entered as 4 years or over, there was not one that did not seem capable of doing the work of a locomotive. Short in body, but massive in limb, a family likeness ran through all, and whether of dapple-gray, beautifully mottled roan, blood-bay or black, each seemed fitted to lift with one strong pull the load of six ordinary farm-horses. The animals capered clumsily, it is true, at the bidding of their grooms, but each movement exhibited a latent force wondrous in its extent.

The entries in this the first ring, evidenced how much the St. Louis Fair has contributed to the improvement of stock in the West. A few years since the display would have been of common breeds—horses not unfit for heavy work, but only to be compared with those exhibited yesterday as the Kaffir to the sturdy hod-carrier of civilization. Nor has this benefit been confined to any narrow limits, the entries placing in sharp competition, Illinois, Missouri and Kansas. From the first named State there were entries of two imported Percherons by Nicholas Hume, of Brighton; of Young Visco, by Peter Berger, of St. Clair; of an imported Normandy horse, "Mouton," by Hill & Bro., of Brighton; of "St. Lawrence" and "Rouen," by E. Dillon & Co., of Normal—breeders who have often carried off both blue and red ribbons in a single ring; of "Independence," "Duc de Chartres," "Mastodon" and "Good-enough," by Jas. A. Perry, of Clifton, Ills., and "John Bell," by Jno. Jarvis, Troy, Ind.

Missouri was represented by "Gen. Sherman," entered by Sebastian Sappington; by "Napoleon Bonaparte," Jeff. K. Clark's Percheron, and Kansas by an entry made by M. Parrott, of Leavenworth.

The contest for supremacy was so close between some half-dozen of the stallions that considerable time was spent by the judges in considering the various points, but finally the stable of Jas. A. Perry, of Clifton, Ills., carried off both prizes, the blue ribbon and $50 being awarded to "Duc de Chartres," a pure blood Norman, of beautiful dapple-gray, 6 years old, weighing 1,900 lbs., and the red ribbon and $25 to "Mastodon," a massive bay, 4 years old, weighing 2,250 lbs. This animal was imported recently by Mr. Perry. In the second ring only one draft stallion of three years and under four put in an appearance, and the premium was awarded to Jno. Murry, Bloomington, Ills.

In the third ring of two year olds and under three, there were two entries, Dillon & Co., of Normal, Ills., exhibiting a large roan gray of Norman blood, to which was awarded the blue ribbon and $25, and W. A. Sowen, of Clark county, Mo., an elegantly formed blood bay of Hambletonian blood—more roadster than draft, though—to which was awarded the red ribbon.

Of one year and under two, there were entries by Jeff. K. Clark, of St. Louis, B. G. Audubon, of Florisant, and E. Dillon & Co., of Normal, Ills. The blue ribbon was awarded to Dillon's entry, a Norman, and the second to Jeff. K. Clark.

Of yearlings, entries were made by Jeff. K. Clark, A. Lassurath and John Hill, of St. Louis, and by E. Dillon & Co., of Normal, Ills., the latter carrying off both the blue and red ribbons, thus consoling himself for the loss of honor in the first ring.

Having thus ran down the scale in draft stallions, the matched stallions, mares and geldings were "rung in," and a beautiful display was made, including in its numbers several of the horses that had appeared in the first ring, the entries being composed of a fine pair owned by C. W. Ford of this city, four pairs of Normandy horses owned by E. Dillon & Co., of Normal, Ills., and two pairs owned by J. A. Perry, of Clifton, Ills. The contest was very close, but finally the blue ribbon was awarded to two massive greys, conquerers in many rings in past years—entries of E. Dillon & Co., of Normal, Ills. There was no second premium in this class.

In the seventh ring, draft geldings 5 years old and over, the entries were: one by Husbands Bros., of St. Louis, and three by Col. C. W. Ford of this city. The latter's entries were fine specimens of horse flesh, being the pick of the stables of the United States Express Co. Both ribbons were awarded to Col. Ford.

In draft geldings 4 years old and under 5, there was but one entry, and that by Col. Jno. O'Fallon carried off the blue ribbon.

In draft mares 5 years and over, the first premium was awarded to a fine animal owned by M. J. Parrott, of Leavenworth, and the red ribbon to Jas. A Perry, of Clifton, Ills.

Of draft mares 4 years and under, there were no entries, and only one three-year old appeared in the eleventh ring—an entry by Dillon & Co., of Normal, Ills., to whom was awarded the blue ribbon. Of draft mares two years and under three, there was one entry by H. Robinson, of Edwardsville, Ills., and three by Dillon & Co., of Normal, Ills., to whom was awarded both the blue and red ribbons. Of one year and under two, the entries were by Jas. Black, of Illinois, to whom was awarded the blue ribbon, and by Dillon & Co., of Normal, to whom was given the red. Of draft mares under one year, the only entries were by E. Dillon & Co., to whom, as this was a field day for their stock, both ribbons were awarded. In the special premium offered by Jeff. K. Clark, there were not a sufficient number of entries to fill the condition, and there were no awards.

ROADSTERS.

In the afternoon the real attractions of the amphitheatre commenced. Draft animals, however statuesque in appearance, look much better in one of those pretty views of rural scenes that painters depict than in the arena. To say the least, such displays are caviare to the general public, however edifying they may be to farmers. Ladies as well as the majority of gentlemen, prefer motion to still life, and to that numerous and undefined class generalized under the head of children—whether they are but miniature editions of humanity or the more graceful and entirely fascinating belles of the school-room—only whirling wheels and flashing eyes of the blooded horse extended at full speed possess true attractions. Therefore it was that in the early morning the amphitheatre was well nigh deserted, and therefore it was that when the matched carriage horses were called in the afternoon the seats began to fill, and as in last year, the enormous expanse of the amphitheatre took on the look of life and flashed back from jewelled dames and beaming lasses kindly greetings to the noble animals.

The display of matched carriage horses, in fact, exceeded that of any previous year, as eighteen pairs entered the arena. There were over a half dozen competitors from the city; the blue grass region sent two or three pairs; and Illinois, Iowa, Kansas and Missouri furnished forth their fleetest and strongest horses. There were in the press fine steppers, high-headed and graceful, yet more fitted to flit along the shaded avenues in the bright moonlight, than to carry the family barouche in dignity through the streets; there were, too, some so slow and sluggish as to belie the character of carriage horses, and others properly belonging to the buggy ring; but there were still a dozen or more that would not ill-beseem the most lordly Clarence that ever fell into stately procession in Hyde Park. The sun, too, shone out right royally upon this display, and as wheeling in time on the outside verge of the arena, exhibiting speed and style, or

curving to the inside in concentric figures to display the "manage" of the animal and the training of the driver, the exhibition was worthy of the occasion. The contest was severe between the fine bays of M. D. Noyes, the stylish blacks of F. O. Day, the high stepping bays of W. M. Tipton, of Odin, Ills., the grays of J. F. Nichols, of Cynthiana, Ky., the really fine carriage horses entered by Wilson, of Albia, Iowa, and Glasson, of Talleda, in the same State, and others, each worthy of a special paragraph. Two teams, both bays, both showing in form and action blood and breeding, attracted general commendation, and to them, both entries of Taylor, Williams & Hall, of Louisville, Ky., was awarded respectively the blue and red ribbons.

Succeeding this ring, the road steamer, drawing a train of Semple & Birge's Whitewater wagons, entered the arena and made several circuits. Afterward, the wagons being detached, the new motor was put through its paces to the edification of the audience. Wheeling in short circles, turning upon its iron axes, running at full speed backward or forward, finally making its exit amid general applause.

LIST OF ENTRIES AND AWARDS.

Stallions, 4 years old and over.—1st. prem. $50; 2nd. prem. $25.

There were 13 entries (mostly Percherons), viz:

Nicholas Hunar, Brighton, Ill., two imported Percheron stallions.

Sebastion Sappington, St. Louis county, Gen. Sherman.

Jeff. K. Clark, St. Louis county, Napoleon Bonaparte, Percheron.

Peter Berger, St. Clair county, Ill., Young Visco.

Hill & Bro., Brighton, Ill., imported Mouton (Normandy).

E. Dillon & Co., Normal, Ills., St. Lawrence and Rover.

James A. Perry, Clifton, Ills., Independence, Duc de Chartres, Mastodon, Denmark, Goodenough.

M. J. Parrott, Leavenworth, Kansas.

John Jarvis, Troy, Ills., John Bell.

Both premiums awarded to James Perry, for Duc de Chartres and Mastodon—the Duc taking the first premium.

Stallions, 3 years and under 4.—1st. prem. $40; 2nd prem. $10. Entry by John Murray, Bloomington, Ills. There being but one entry, the premium was awarded to John Murray.

Stallions, 2 years and under 3.—1st. prem. $25; 2nd. prem. $5. Entries by

E. Dillon & Co., Normal, Ills.

W. A. Sowers, Clark county, Mo.

J. Whittaker, St. Louis.

1st. prem. awarded to E. Dillon & Co., Normal, Ills.

2nd. prem. awarded to W. A. Sowers, Clark county, Mo.

Stallions, 1 year and under 2.—1st. prem. $15; 2nd. prem. $5. Entries by

Jeff. K. Clark, St. Louis.

B. G. Aubuchon, Florissant.

E. Dillon & Co., Normal, Ills.

1st. prem. awarded to E. Dillon & Co., Normal Ills.; 2nd. prem. to Jeff. K. Clark, St. Louis.

Stallions, under 1 year.—1st. prem. $10; 2d. prem. $5. Entries by

Jeff. K. Clark, St. Louis.

E. Dillon & Co., Normal, Ills.

John Hill, St. Louis.

A. Lasseurath, St. Louis county.

1st. prem. awarded to E. Dillon & Co., Normal, Ills.; 2nd. prem. to same.

Best pair of Draft Stallions, Mares or Geldings.—1st. prem. $50. Entries by

C. W. Ford, St. Louis.

E. Dillon & Co., Normal, Ills., 4 entries.

J. A. Perry & Co., Clifton, Ills., two entries.

1st. prem. awarded to E. Dillon & Co.

Draft Geldings, 5 years old and over.—1st. prem. $25; 2nd. prem. $10. Entries by

Husbands Bros., St. Louis.

C. W. Ford, St. Louis, three entries.

1st. prem. awarded to C. W. Ford, St. Louis; 2nd. prem. to same.

Draft Mares, 5 years and over (breeders).—1st. prem. $30; 2nd. prem. $15. Entries by

Jeff. K. Clark, St. Louis.

B. G. Aubuchon, Florisant.

E. Dillon & Co., Ills., five entries.

M. J. Parrott, Leavenworth, Kas.

James A. Perry, Clifton, Ills., two entries.

Jno. Hill, St. Clair county, Ills.

J. H. Pickrell, Harristown, Ills.

1st. prem. awarded to M. J. Parrott, Kas.; 2nd. prem. James A. Perry, Clifton, Ills.

Some very fine animals appeared in this ring.

Draft Mares, 3 years and under 4.—1st. prem. $25; 2nd. prem. $10.

1st. prem. to E. Dillon & Co.

Draft Mares, 2 years and under 3.—1st. prem. $20; 2d. prem. $5.

Entries by Henry Robinson, Edwardsville, Ill.

E. Dillon & Co., Normal, Ill., three entries.

1st. prem. to E. Dillon & Co.; 2d. prem., to same.

Draft Mares, 1 year and under 2.—1st. prem. $15; 2d. prem. $5. Entries by

James Black, Ill.

E. Dillon & Co., Normal, Ills.

1st. prem. to E. Dillon Co.; 2nd. prem. to James Black.

Draft Mares, under 1 year.—1st. prem. $10; 2nd. prem. $5. Entries by

E. Dillon & Co., Normal, Ills., three entries.

John Hill, St. Clair county, Ills.

Both premiums to E. Dillon & Co.

Matched Mares or Horses for Carriages.—1st. prem. $100; 2d. prem. $25. Entries by

R. J. Lackland, St. Louis.

J. S. Nanson, St. Louis.

N. W. Mitchell, St. Louis.

W. E. Storer, St. Louis.

N. D. Noyes, St. Louis.

Johnson & McPike, St. Louis.

James F. Nichols, Cynthiana, Ky.

George Martin, St. Louis.

H. McGlassen, Tallula, Ills.

W. M. Tipton, Odin, Ills.

J. H. Locke, St. Louis.

C. M. Wilson, Albia, Ills.

T. C. Graves, Petra, Mo.

Taylor, Williams & Hall, Louisville, Ky., two entries.

Alex Kelsey, St. Charles, Mo.

L. F. Hudson, Saline county, Mo.

Stockwell & Byington, Quincy, Ills.

Horkaday, Columbia, Mo.

Both premiums awarded to Taylor, Williams & Hall, Louisville, Ky.

Matched Horses for Buggy.—1st. prem. $50; 2nd. prem. $20. Entries by

A. W. Mitchell, St. Louis, Thunder and Lightning.

Chas. Parson, St. Louis, St. Lawrence and mate.

N. D. Noyes, St. Louis, Young Ethan and mate.

P. R. Warner, St. Louis.

J. T. Nichols, Cynthiana, Ky.

J. H. Paulin, Logan county, Ills., Altona and Nero.

C'Bannon & Parish, Miami, Mo.

H. McGlasson, Tallula, Ills.

W. M. Tipton, Odin, Ill.

Geo. P. Davis, Bloomington, Ill.

J. M. Wilson, Albia, Iowa.

J. T. Spencer, Charlesburg, Ky.

Clay Taylor, Warren county, Mo.

R. Lindsay, St. Louis.

J. C. Kelly, St. Louis.

Taylor, Williams & Hall, Louisville, Ky., two entries.

F. J. Barbee, Paris, Ky.

Hubbell & Quarles, Columbia, Mo.

1st. prem. to Taylor, Williams & Hall, Louisville; 2nd. prem. to J. C. Kelly, St. Louis.

Matched Mares for Buggy.—1st. prem. $50; 2nd. prem. $20. Entries by

J. L. Patterson, St. Louis.

J. W. Vaughan, St. Louis.

Geo. Martin, St. Louis.

J. C. Kelly, St. Louis.

W. M. Tipton, Odin, Ills.

J. H. Lock, St. Louis.

T. C. Graves, Petra, Mo.

J. F. Spencer, Lexington, Ky.

R. D. Lancaster, St. Louis.
A. D. Carson, Kansas City.
L. L. Dorsey, Louisville, Ky.

1st. prem. to A. D. Carson, Kansas City; 2nd. prem. to T. C. Graves, Petra, Mo.

Fastest mule, 1st. prem. $50; 2nd. prem. $25; 3rd. prem. $15. Four times round the Amphitheatre. Entries by

John Thomas, St. Louis, Monkey.
J. H. Paulin, Logan county, Ills.
J. N. Shirts, Delaware, Ills., Gypsy Kate.
J. H. Verbrych, Dleavan, Ills., Kitty Scott.
G. W. Wymere, Liberty, Mo.
James Reilly, St. Louis.
George Wise, St. Louis.
J. F. Quissenberry, St. Louis.
T. J. Thompson, St. Louis.
J. W. McCaw, ——.
C. L. Hunt, St. Louis.
D. Wolfe, St. Louis.

This being the last performance of the day, it was designed more for sport than the improvement of the running qualities of the mule.

The judges were Senator Frank Blair, Senator Carl Schurz, and Hon. J. S. Rollins.

The riders were nearly all boys, and several of them of the colored persuasion. One was dressed like a Highlander, another wore red pantaloons, and several had red ribbons on. Captain Dan Able, Colonel C. M. Elleard, and Hon. John Finn were the principal starters. The entries were called up one by one, made to toe a mark, and at the signal off they scampered in a huddle. Red breeches took the lead, closely followed by dirty jacket. The Highlander's mule took the sulks and dropped behind. About half the mules flew the track, and taking a near cut, got in advance of those that run fairly. A colored boy on a lazy mule was passed twice by the swifter mules, but he kept steadily on, and won a prize by being in advance at the close, although running only half the distance of the others.

Fortunately, no accidents happened. When the judges came to make the awards, it was hard to tell 'tother from which, the mules and their riders were so much alike. However, they gave the first premium to the mule of J. W. McCaw, ridden by Willie Gillespie. Second premium to J. N. Shirts, Delaware, Ills. Third to C. L. Hunt, St. Louis.

Thus ended the first day's performance in the Amphitheatre.

SECOND DAY—TUESDAY.

DEVON, AYERSHIRE, ALDERNEY, AND HEREFORD CATTLE.

JEFF. K. CLARK, SUPERINTENDENT.

The Fair is fully inaugurated. Yesterday pronounced it a glorious success. To-day emphasises the utterance of yesterday. The trains and steamers during yesterday, last night and this morning have added many thousands to the visitors from every part of the country, and this morning finds them hastening to the great center of attraction. They come by almost every means of transportation which modern science has invented. The street railroads are in the ascendant. They transport from four to five thousand people on trains from the center of the city to the Fair Grounds. Next to them come multitudes of vehicles of every size, style and character, from a thousand dollar carriage all the way down to a donkey cart. Fortunately for the Fair, more fortunately for the people, the sprinkling committee have attended very carefully to their business. We feared that they would make a boggle of the business, by praying to the weather clerk when the wind was in the wrong direction; but they have accepted the situation, and made a demand upon the Father of Waters, and this great flood has responded, so that the watery fluid is poured, squirted and sprinkled here and there and everywhere.

The Grounds, notwithstanding the multitudes present, are free from dust. The walks and drives are kept thoroughly saturated, and even the grass and trees try to look green under this artificial visitation. At the same time, the main avenues leading to the Fair Grounds are so well sprinkled, that there is no annoyance from the dust.

For this exemption from a very great evil the visitors at the Fair are specially indebted to the foresight, liberality and energy of the management of the Fair Association. President Barret, as the head of this Association, has used every effort to contribute to the comfort and convenience of the vast multitude of visitors, and his exertions have been warmly seconded by the Directors.

One marked feature of the Fair this year is its aspect of permanence; it looks—if the expression is allowable—as though it had

"come to stay." Heretofore there has been, to a certain extent, at least, an unfinished appearance to some of the accompaniments and surroundings; as if a shadowy possibility existed that the whole might drift away like a dream of the night, and "leave not a rack behind." Other institutions, similar in kind if not in degree, have been born, lived a little while, and then vanished into thin air—why not this of ours? The question was natural enough, and although we do not suppose it ever found lodgment for a moment in the minds of the management, yet as it is manifestly impossible to bring things to their proper state of completion except through the slow process of years, visitors—more especially from abroad—were, perhaps, justified in thinking that by-and-by, the great St. Louis Fair would dissolve into its original elements and disappear forever. But there are no longer any interrogation points written on the face of the grand carnival of agriculture and art; its countenance is solid and substantial, indicating wealth, prosperity, dignity and importance; and even the most skeptical are compelled to confess that there is not the smallest chance of swift annihilation or gradual decay. The ample grounds have been prepared with an eye only for the use to which they are exclusively dedicated; the ornamental portions of them are as carefully tended as if belonging to the landscape garden of a millionaire; the buildings, one and all, are constructed in an enduring as well as tasteful style; and each returning season finds improvements, here and there, the necessity of which, though scarcely perceptible before, is plainly revealed now when the want is supplied. Among these are two which appear to fine advantage—the offices of the President and Secretary of the Association. Handsome, convenient, and suitably located, they add very much to the general effect, besides proving, in a most conclusive and agreeable manner, that the vast fabric of which they form a part, is no ephemeral experiment, but an accomplished and brilliant fact.

A PLACE OF REST.

The noblest pair of legs that ever trotted the road which leads from the cradle to the grave; the keenest pair of eyes that ever stared at the present, or tried to peer into the mysteries of the future, will occasionally clamor for repose—especially if legs and eyes are tested in wandering through such a Fair as this. Therefore a place of rest is exceedingly desirable, and within the area of the old amphitheatre is one made to order. It is comparatively small, so small, indeed, that one wonders where the crowds of other days could find room; but the lack of quantity is more than atoned for by the quality. The grass here is not quite so dead; the din from the surging multitude without is broken by the encircling building, giving a tiny bit of stillness in the ocean of noise; the Arsenal band in the pagoda serves up unexceptionable music, and the visitor can

gather up his scattered thoughts and recruit his exhausted energies, undisturbed by the intrusive toes and elbows of the throng. Close at hand, too, is the fine art gallery, the floral and fruit department, the depository of silk bed-quilts, the collection of jams and jellies, and various articles designed to adorn or comfort the inner and the outer man. These can be inspected during the intervals of repose, and taking it all in all, the old amphitheatre and its belongings will repay long and frequent calls.

THE AMPHITHEATRE.

As on Monday, the seats of the amphitheatre filled slowly in the morning, and until afternoon there was a beggarly array of empty benches. In fact, at a popular exhibition of this character, it is too much to expect the multitude to sit in endless silence while judges weigh the comparative merits of cattle, and hesitate for hours as to the relative points of the herds of Illinois, Missouri, Minnesota, Kansas, Tennessee or Kentucky. Yet the exhibition might be made interesting as well as instructive. On the grounds of the Association each year are gathered the pick of the herds of the United States, and if all were shown at once in one ring, there would be such a display as has never been equaled in this or any other country. This might be accompanied by the awarding committees deciding upon the relative merits of each grade of animals outside of the arena, and then at a given hour have all pass in review through the amphitheatre. This would gather in the ring at once short horn and Devon, Jersey and native, fat animals and milch cows, each class carrying the blue and red ribbons, with all the competitors joining in an ovation to successful merit. Such a scene—the broad arena covered with the finest specimen of the bovine species in all their perfection of form and glistening colors, as excelling by far the wildest dream of prairies covered by countless herds—would attract to the seats of the amphitheatre an audience fit to do honor to the emperors and queens of the field. Yesterday, however,

THE CATTLE EXHIBITION

Attracted few persons, although in the ring were displayed wild-eyed and gracefully formed Alderneys, the more sturdy Ayershires, the lordly Herefords, the best specimens of native cattle or the magnificent short horns. There were to be seen the pick of the herds of Canada, the Dominion being represented by Mr. Toms; fine animals from the fields of W. S. King, of Minnesota; the fine display of Pickerell, of Illinois; fat and sturdy specimens of the feeding qualities of blue grass as shown in the entries of Shropshire and others of Kentucky, and the flower of the herds from the mountains of East Tennessee, while Missouri was duly represented. There were in the arena cows whose udders gave the shame to the product of the average of dairies, and bullocks with briskets and loins that promised steaks and roasts that would be as a *pate de foie gras* to the meats that adorn the generality of butchers' stalls. The display of short horns was particularly excellent, as there were included in it animals like those of Pickerell, and that of King, that are scarcely second to any in the world. And then so fine was the display that the Directors increased the number of premiums, giving two where only one was announced in the printed programme. The following shows the entries and awards in each class, and as will be noted, though unsuccessful in obtaining a blue or even a red ribbon, U. S. Grant was among the exhibitors.:

In the first ring of Devon bulls of any age there were three entries: One by J. L. Hyatt, of Florisant, one by W. W. Henderson, of St. Louis, and one, "Prince Arthur," by S. Toms, of Oshawa, Canada. The first premium, $75, was awarded to S. Toms. of Oshawa, Canada, and the second to W. W. Henderson, of St. Louis. Of Devon cows of any age there were two entries by W. W. Henderson and J. L. Hyatt, of St. Louis,

and two by S. Toms, of Oshawa, Canada. The 1st. premium was awarded to J. L. Hyatt, of St. Louis, and the 2nd. to S. Toms, of Oshawa, Canada.

Of Ayreshire bulls of any age there were entries by John A. Malone, of Sparta, Ills., two by W. S. King, of Minneapolis, Minn., and one by W. B. Collier of Bridgeton, Mo. The entry of W. S. King, of Minnesota, carried off the blue ribbon and premium of $75, and that of Mr. Collier the second. Of Ayreshire cows of any age W. S. King, of Minneapolis, made a fine display, entering no less than eight specimens of his fine herd. The only other entry was by W. B. Collier, of St. Louis county. The 1st. and 2nd. premiums were awarded to W. S. King, of Minnesota.

Of Alderney (or Jersey) bulls there were entries by Thos. L. Turner, J. J. O'Fallon, Pres. U. S. Grant, C. L. Hunt, and Joe Whittaker, of St. Louis; by S. C. Colt, Hartford, Conn.; R. Rice, Butler, Ills.; S. McDonald, Terre Haute, Ind.; Herr & Prather, St. Matthews, Ky., C. S. Clarkson, and W. B. Collier, St. Louis county. The blue ribbon and $75 was awarded to "Clive," entered by Chas. L. Hunt, of St. Louis county, and the red ribbon to S. C. Colt's entry.

Of Alderney cows of any age, there were entries by Thos. T. Turner (five), J. J. O'Fallon, Jas. M. Brawner, Pres. U. S. Grant (four), C. L. Hunt (two), and L. H. Baker, of St. Louis; S. C. Colt, of Connecticut (two); S. W. McDonald (three), Terre Haute, Ind., and Herr & Prather, of Kentucky. The first premium, $50, was awarded to Herr & Prather, of Kentucky, and the second to S. C. Colt, of Hartford, Conn.

Of Hereford bulls there was but one entry, that of W. W. Aldrich, of Elyria, Ohio, and to this entry both the blue and red ribbons were awarded.

The same party entered the only Hereford cow, and again carried off the blue ribbon.

Of grade or native cows and heifers, three years and over, there were entries by J. T. Campion and W. Shoemaker (two), of St. Louis; by C. S. Butler, of Payson, Ills., J. Chorn, of Towanda, Ills. and J. J. Quissenberry, of St. Louis. The blue ribbon and $30 was awarded to Mr. Chorn, of Illinois, and the red and $20 to J. T. Campion, of St. Louis county.

Of the same class two years and under three, there were entries by J. W. Carter, of St. Louis, C. S. Butler, of Payson, Ills., and J. Chorn, of Towanda, Ills., the entry of Joseph Chorn, of Illinois, carrying off the blue ribbon, and that of C. S. Butler, of Payson, Ills., the red.

Of one year old and under two there were entries by John J. Miller, W. M. Miller and James Miller, of St. Louis; by C. S. Butler, of Payson, Ills.; and J. Chorn, of Towanda, Ills.; and in this ring Mr. Chorn carried off both premiums.

Under one year old there were entries by Butler, of Payson, Ills.; three by J. Chorn, of Towanda, Ills.; and two by Jacob See, of Missouri; and again Mr Chorn carried off both the blue and red ribbons.

Of milch cows there were entries by John Quisenberry and Thomas J. Turner, of St. Louis; by C. S. Butler, of Payson, Ills.; and Herr & Prather, of St. Matthews, Ky. The first premium was awarded to Herr & Prather, and the second to C. S. Butler.

Of fat cows, four years and over, there were entries by Edward Iles, of Springfield, Ills., and Jeff. Bridgeford, of Paris, Mo. The awards were made in the rotation of entries, Mr. Iles obtaining the blue and Mr. Bridgeford the red ribbon.

Of fat cows, three years and under four, there was only one entry, that of J. S. Kissinger, of Clarksville, Mo., and to that was awarded the first premium.

Of short horns there was a better display; and of bulls, four years and over, there were entries by J. Pickerell, of Harrison, Ills.; L. W. Cash, of Chicago; Thos. W. Garrard, of Martinsburg, Mo., and J. Chorn, of Towanda, Ills. The first premium was awarded to Pickrell's Baron Booth, and the second to Garrard's Red Duke. 1st. premium, $150; 2nd. premium, $75.

Of short-horned bulls, three years and under four, there were entries by S.

Dunlap, of Jacksonville, Ills. ("Imperial Belleville"); by A. C. Shropshire, of Leesburg, Ky.; by T. H. Kissenger, Clarksville, Mo.; Jeff. Bridgeford, of Paris, Ky., and W. S. King of Minnesota.

The first premium was carried off by W. S. King's imported "Old Sam," and the second by J. H. Kissenger, of Clarksville, Mo.

Of bulls (short-horn), two years and under three, there were entries by B. F. Ketchum ("Young Millington"), of East Tennessee; Geo. M. Bedford (3), of Paris, Ky.; J. H. Kissenger, of Clarksville, Mo., and H. Larrimore, of Fulton, Mo. The first premium, $60, awarded to J. H. Kissenger, Clarksville, Mo., and the second, $25, to H. Larrimore, Fulton, Mo.

Of short-horns, one year and under two, there were eleven entries, the exhibitors being B. F. Ketchum of East Tennessee; S. Dunlap, of Jacksonville, Ills.; Geo. M. Bedford, of Paris, Ky.; A. C. Shropshire, of Leesburg, Ky.; Augusta Shropshire, of Paris, Ky.; Edward Iles, of Springfield, Ills.; A. W. Almon, Salem, Ills.; J. Chorn, Towanda, Ills. The first premium $40, awarded to J. H. Pickerell's Baron Lewis, and the second, $25, to Prince Geneva, the second the entry of Mr. Bedford.

Of short-horn bulls, under one year, there were entries by S. Dunlap, of Jacksonville, Ills. (2); J. H. Pickerell, of Harristown, Ills. (2); Aug. Shropshire, of Paris, Ky.; by W. S. King, of Minnesota; J. Chorn, of Towanda, Ills. (2); Edward Iles, of Springfield, Ills.; J. H. Kissinger, of Clarksville, Mo. (2); and by H. Larrimore, of Fulton, Mo. The first premium, $25, to "General Lepere," the entry of W. S. King, and the second to J. H. Pickerell.

DOUBLE TEAM TROT.

This was an outgrowth of the rivalry on Page avenue by owners of fast teams, which occasioned some spirited words, and finally culminated in the offering of a special premium by Mr. Wilson, for the fastest roadsters, to be decided by a spirt of six times around the arena at the Fair Ground. The test was not fully made, as but one of the St. Louis road teams, that of L. B. Wakefield, was entered, their competitors being a pair of grey Messengers, Gen. Boswell and mate, owned by Jas. T. Nichols, of Cynthiana, Ky. The teams were driven around the ring several times before called for a start, and Wakefield's splendid Grey Eagles drew merited applause by their spirited and stylish action, and as appeared in the sequel, showed speed sufficient to warrant their claim as speedy roadsters.

The teams were necessarily sent off singly, and Wakefield's opened the ball. Driven steadily, and making but few breaks, they made the six circuits in 4:20. Their competitors broke more often, the driver having been injured the day previous and incapacitated from handling them properly, but at times showed bursts of considerable speed. Wakefield's team, however, outfooted them, the Messengers only making the required circuits in 4:46, and carried off the ribbon and the honors. A skip was now made in the programme, and omitting for the moment the exhibition of horses of all work, the Superintendent called in

THE PACERS

To contend for three premiums of $100, $50 and $25 respectively, in a dash of four times around the arena. We give the entries with the time made by each:

T. S. Ribby, of Louisiana, Mo., entered a bay. Time 2:40.

T. T. Roach, of Louisville, entered "Dan Voorhees." Time 2:31 1-2.

C. T. Dunnell, of Clinton county, Ills., entered a bay, "Don." Time 3:14 3-4.

Jas. Wilson, of Indianapolis, entered "Hoosier Tom." Time 2:37 1-4.

Alex. Gillespie, city, entered sorrel mare, "Cotton Picker." Time 2:24 1-4.

F. C. Smith, city, entered "Blue Buck." Time 2:26 1-2.

A. D. Carson, of Kansas City, entered "Jenny Crews." Time 2:33.

R. D. Lancaster, city, entered grey, "Judge Lanham." Time 2-45.

E. D. Bassett, of Middle Grove, Mo., entered "Tom Hall." Time 2:53 3-4.

J. V. Schenck, city, entered "Prince." Time 2:47.

The award, of course, was as indicated by the figures given—to Gillespie's "Cotton Picker" the first; to Smith's "Blue Buck" the second, and to Roach's "Dan Voorhees" the third.

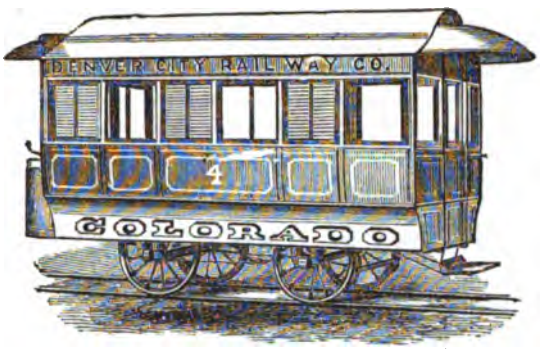
As soon as the pacing race was over the most of the seven or eight thousand who had witnessed it left the amphitheatre under the impression that the exhibition for the day had been concluded. This, however, was a grievous mistake, as there followed

THE FINEST "RING OF THE DAY,"

If not, indeed, as fine as any ever shown, or to be shown, in the arena. The display was the showing of stallions of all work, five years and over, which brought to the arena some twenty-four entries, including from St. Louis, Sappington's "Gen. Sherman," Cashman's "Pilot," Tom Best's "Ben Patchen," Col. Colman's "Abdallah," and C. J. Morton's "Hartford Hambletonian;" from Illinois, Peter Berger's "Young Vigo," James A. Perry's "Mick," and "Commodore Perry," G. T. Perry's "Kentucky Bolivar," the entries of G. P. Davis, W. Guenell and John Jarvis; from Kentucky, Callaway & Ireland's "Blood Chief and Arlington Denmark," Meier & Hayden's entry; Ten Broeck's imported "Phaeton," the sire of most of the English winners of last year; from Michigan, W. G. Hill's entry; from Wisconsin, E. P. Dickey's "Bellefounder;" from Cincinnati, Eberlin's "Lexington;" from Iowa, J. M. Wilson's entry; while the State of Missouri was represented by such horses as Lew Wright's "Lotty Golddust," the conqueror in many rings, Carson's (Kansas City) "Grey Eagle," and others.

As may be gathered by this list, the competition was very close, and the scene as "Arlington Denmark" was put through his paces under the saddle, as Golddust, Hambletonian, Abdallah, Blood Chief, and others circled the arena at marvellous speed, and Phaeton and the led animals gambolled at the bidding of grooms, was worthy of a crowded audience and enthusiastic cheers. There were in the ring animals of untold value, exhibiting almost all strains of blood, from pure thoroughbred, tracing descent back to Godolphin's Arab, to the sturdy Norman, which in its native country whirls a diligence along at twelve miles an hour. If ever animal life exhibited the grace and poetry of motion, it was in that ring, beheld by scarce five hundred spectators. The judges were for a time at fault as to the award. The ring was narrowed down by the exclusion of those too near the draft horse standard, and those too light for heavy work on the road, and then the remainder were deployed in sections and examined singly again and again. Finally the award was made, giving both the premiums to the stable of Callaway & Ireland, of Eminence, Ky., who have as fine a stable of horses as was ever shown at a Fair here or elsewhere, the blue being tied to "Blood Chief," and the red to "Arlington Denmark."

This closed the exhibition for the day.



TRANSFERRED FROM CLASS C.

THIRD DAY—WEDNESDAY.

CATTLE—SHORT-HORNS.

JEFF. K. CLARK, SUPERINTENDENT.

Another glorious morning for the Fair. There has been a feverish excitement all through the country—a fear that the long delayed rain would come down as a deluge, and prove a wet blanket for the whole grand exhibition. This fear has kept thousands from coming to St. Louis during the last few days. Notwithstanding the outside dust and the universal fear of a deluge to follow the drought, the multitude of visitors has been constantly increasing since Monday morning. Monday was a success, as we pronounced it, Tuesday was far greater, as our record of it shows. But what shall we say about Wednesday? To say that it is equal to any other Thursday, when the whole city has its holiday and all the world with its wife and children come to the Fair, would be no more than justice. From early morning the multitudes of strangers in the city were making their way to the Fair Grounds. The various lines of street cars were crowded, and each vehicle, as it started on its way, resembled a beehive, just about to send off a great colony of industrious insects. The proprietors of hacks, omnibusses, carriages, buggies, furniture cars and donkey carts were all happy, because each could fill his vehicle at a paying price. By ten o'clock the Grounds were absolutely thronged. The various departments were almost impassable; the great amphitheatre, that can accommodate forty or fifty thousand spectators, had scarcely a "stand point" left! and all the walks, and drives, and shady groves, and grassy lawns were literally covered with people.

The trains arriving from the north, south, east and west, are all crowded with people. The hotels and boarding houses of the city are filled to overflowing with guests, and new comers are glad to pay a premium for a place to stand up.

And why is this mighty multitude gathered here? Whence do they come and what attracts them hither? Have they come to witness an idle pageant? Are they here as they would go to a ball or

masquerade? What means all this music, these flaunting flags and shouting crowds? They mean that this is the grand autumnal festival of the great West. They mean that here, during this first week of October, are gathered the richest and fairest offerings from the gardens, fields, farms, workshops, mines, factories—in fact from every department of industry in the great empire of the West. And here her sons and daughters assemble, not merely to gratify an idle curiosity, but to gather wisdom from the experience of others, and to return home happier and wiser people than they were before.

COTTON HEADQUARTERS.

In our special report of this branch of the industrial show, we have more than once alluded to the arrangements of the apartments dedicated to the exhibition of the great staple, and the enjoyment of the dealers therein. And the cotton headquarters are indeed worthy of favorable notice, and ought to be visited by all those who wish to see one of the newest and most prominent features of the Fair. The spacious parlor is fitted up almost luxuriously; chairs, sofas, and tables give it a home-like appearance; the walls are hung with the choicest specimens of the advertising art, and tastefully draped with flags, evergreens, and other appropriate adornments; and the whole gives the impression that there is something here somewhere of unusual dignity and value. So there is, and yet we do not mean the cotton dealers themselves, though they are as dignified, valuable, and good-looking a set of gentlemen as can be found on the continent. These are but the courtiers in attendance upon the monarch—if we pass out of the reception room to the hall beyond, and thence to the platform, a glimpse may be had of the monarch himself. These clumsy bales, hooped with iron, and laid side by side in monotonous rows, are not particularly prepossessing to the unreflective observer, and many pass them by in ill-concealed contempt. But "to the mind's eye, Horatio," they loom into gigantic proportions, and in their presence, all else dwarfs to insignificance. Other nations raise as fine stock as we do, manufacture goods equally as well and as cheap, construct as ingenious machinery, produce as bountiful crops, paint rarer pictures, chisel more elegant sculpture—do everything, in fact, as well as ourselves, save in one single direction. That snowy fibre oozing out of those torn bales, can be grown no where else so successfully as in America, and America, therefore, is the chosen dwelling place of the king that literally dominates over the globe. If the corn, the wheat, the pork, the beef, the horses, the mules, the iron, the lead, the copper, the precious metals—if all were swept from the soil of the United States, never to be evolved from it again, the scepter of King Cotton would draw supplies for all our wants from the uttermost parts of the earth. With

cotton, the commercial supremacy of the republic is fixed on everlasting foundations—without it, and to use the mildest expression, Uncle Sam would play second violin in the financial orchestra of Christendom. Let nobody, then, laugh at the notion of a "cotton parlor," for cotton is worthy a palace.

THE AMPHITHEATER.

As the exhibition in the arena was more spirited yesterday than on Monday or Tuesday, so too the attendance was larger, the display of loveliness, adorned in the brightest colors and in the most faultless style—not the least of the attraction of the St. Louis Fair—more splendid than on any day of this or any previous year. A noticeable feature, too, was that the audience consisted largely of visitors to the city rather than of residents—that the beauty bore the bloom of air free from the dust of our streets, transplanting as it were the fragrance of the heath and the mountain to the arid waste of macadam and brown stone—the purity of virgin solitudes to the bustle and clamor of busy throngs—a fact, perhaps, more marked in the morning than in the afternoon. At ten o'clock the seats were well filled, perhaps fully five thousand assembling that early to witness the exhibition of

THE DEFERRED RINGS.

These, carried over from Tuesday, comprised "stallions of all work," from four years of age down, and although in no one ring was there as fine a display of mettled speed as marked the first ring of the day (shown on Tuesday), the scene was sufficiently animated to reward the most listless observer. The first ring called was that of stallions of all work, four years and under five, for which there was but one entry, and that not being deemed by the judges sufficiently worthy was sent out without either the blue or red ribbon.

Of three year olds, there were eight entries, each of marked excellence. There were Gen. Grant's "Young Hambletonian," L. Salisbury's (of Chariton, Mo.), "Logan," while Muir & Hayden, of Lexington, showed a fine Mambrino, "Trojan;" P. H. Dorsey, of Illinois, a representative "Golddust;" J. W. Spotswood, of Randolph county, Mo., "Jno. Randolph;" A. S. Garland, of St. Charles, Mo., his fine horse, "St. Louis;" Geo. P. Davis, of Bloomington, Ills., two fine blacks, and Jno. Murray, of the same place, a very stylish animal. The contest between these really superb animals was very close. Time and again the horses were sent off for trials of speed, and for half an hour the audience applauded most impartially each and all the animals. The trial, too, was diversified with a real, though harmless runaway. Dorsey's Golddust escaped from a groom and sped around the arena several times at his top speed. One of the audience leaped the fence in front of the benches and caught the horse while running at full speed. This interval had been sufficient to afford the judges opportunity to make their awards, and to this racing trotter, Golddust, the red ribbon was given, while the Mambrino horse, entered by Muir & Hayden, carried off the blue ribbon.

The second ring was even finer than the first, as of stallions two years old, there were fifteen entries, including Gen. Grant's White Cloud colt, W. H. Sawer's "St. Lawrence," E. S. Wadsworth's (of Chicago), "Woodford" and "Woodburn Pilot," S. Kennan's "Green Mountain," two Golddusts entered by the Dorsey from Illinois, and the Dorsey from Kentucky. There were other entries, including another pair of blacks shown by G. P. Davis, of Bloomington, Ills., and a fine colt from Col. Colman's stock farm in Jefferson county. The display, too, was most excellent, as Colman's "Abdallah, jr.," tried conclusions with Gen. Grant's grey colt, or the Golddusts, spurted around the ring, accompanied by the Chicago team, and followed close up by Davis' blacks. Some time was spent in making the award, but finally the judges gave the blue ribbon to "Green

Mountain," entered by S. Kennon, of Columbia, Mo., and the red to the Golddust, shown by L. L. Dorsey, of Kentucky.

Of stallions one year old and under two, there were seven entries, including "Mambrino Patchen," shown by Wadsworth, of Chicago; "Black Prince," owned by winner in the preceding ring, and a young Hambletonian belonging to C. J. Morton, of this city. The judges awarded the blue ribbon to a magnificent bay, shown by Geo. Weedman, of Farmer City, Ills., and the red to a Golddust shown by P. H. Dorsey, of Bunker Hill. This closed the morning's display of horses, and the scene shifted to a display of

THE SHORT HORNS.

The display of imported and native cattle for the day was truly grand, as beside the classes to which premiums were awarded, the sweepstakes rings, afterward deferred until to-day, were brought into the arena, where were grouped in pairs, in threes and fours, and in herds, short horns and Devons, Ayreshires and Alderneys, Dutch lowland (the Holstein) and Bramahs, each displaying in the best form the manifold points of excellence claimed for the respective breeds, and all displaying the perfection of form and beauty. The decisions of the judges, too, was tardily given, and it was owing to some difficulties among the gentlemen that a portion of the cattle display was carried over until to-day. The balloting for awards in the short horn classes, it appears, resulted in ties, and an extra judge was summoned as an arbitrator, whereupon two of the judges claiming, it is said by exhibitors, that there was a desire to favor native bred to the exclusion of imported cattle, refused to serve. Learning this, Col. King, of Minnesota, and Edwards Iles, of Springfield, the two representative importers, withdrew their animals from all the rings. In doing this they stated that they fully exonerated the officers of the Association from any discourteous, unkind or partial act. The character and quality of the display of short horns is shown by the following statement of awards and entries in each class:

In the first ring, cows four years and over, there were entries by B. F. Ketchum, Marble Hill, East Tennessee, "Hope Tenth;" by S. Dunlap, Jacksonville, Ills., "Lady Pauline," and "Dianna;" by B. F. Bedford, Paris, Ky. (two); by A. W. Almon, Salem, Ills.; by W. S. King, Minneapolis, Minn. (three); by Edward Iles, Springfield, Ills. (two); by J. H. Kissenger, Clarksville, Mo., and by Jeff. Bridgeford, Paris, Mo. (two). The first premium, $100, awarded imported "Henrietta," one of Col. King's entries, and the second, $50, to Jeff. Bridgeford, of Missouri.

In the second ring of cows, three years old and under four, the exhibitors were: Pres. U. S. Grant, St. Louis; S. Dunlap, Jacksonville, Ills., "Western Lady;" J. H. Pickerell, of Harrisonville, Ills, "Bride 15th;" W. S. King, Minnesota (two); Edwin Iles, Springfield, Ills. (two), and J.H. Kissenger, Clarksville, Mo. (two). The first premium, $75, J. H. Pickerell, of Harristown, Ills., and the second, $50, S. Dunlap, Jacksonville, Ills.

Of heifers two years old and under three, there were entries by S. Dunlap, Jacksonville, Ills., "Gertrude" and "Roxey;" J. H. Pickerell, Harristown, Ills., "Netty Pierce," Luan Hill 2nd., and "Amaryllis;" A. C. Shropshire, Leesburg, Ky.; M. Shropshire, of Centreville, Ky.; A. Shropshire, Paris, Ky.; A. W. Shropshire, Paris, Ky.; A. W. Almon, Salem, Ills.; W. S. King, Minnesota (four); Edward Iles, Springfield, Ills. (two); J. H. Kissinger, Clarksville, Mo., and Jeff. Bridgeford, Paris, Mo., (three). The first premium $50, awarded, to Aug. Shropshire, of Paris, Ky., and the second, $25, to J. H. Pickerell, of Harristown.

Of heifers one year and under two, the exhibitors were: S. Dunlap, Jacksonville, Ills.; Geo. M. Bedford, Paris, Ky. (five); J. H. Pickerell, Harristown, Ills. (three); A. W. Almon, Salem, Ills. (four); W. S. King, Minnesota, (two); Edward Iles, Springfield, Ills.; J. H. Kissenger, Clarksville, Mo., (two) and Jeff. Bridgeford, Mo. The first prem., $40, was

awarded to A. W. Almon, and the second, $20, to Jeff. Bridgeford.

Of heifers under one year, there were entries by Geo. M. Bedford, Paris, Ky.; J. H. Pickerell, Harristown, Ills., (four); B. F. Bedford, Paris, Ky., (two); A. C. Shropshire, Leesburg, Ky., (two); F. Shropshire, Centreville, Ky.; J. Chorn, Towanda, Ills.; Edward Ilea, Springfield, Ills.; J. H. Kissenger, Clarksville, Mo.; Jeff. Bridgeford, Paris, Mo., and H. Larrimore, Fulton, Mo. The first premium. $25, awarded to H. Larrimore, and the $15, second to J. H. Kissenger.

Among the delayed exhibitors we note W. R. Duncan, of Towanda, Ills., the winner of many a blue ribbon in past years, who, delayed on the river, only arrived yesterday with his fine herd of short horns.

A FINE DISPLAY OF GELDINGS.

Horses of all work, 1st. prem. $100; 2nd. prem. $50.

In the afternoon the amphitheatre was crowded nearly to its full capacity, and the Superintendent, yielding to the visible desire of the vast audience, called in the horses, even before the cattle were dismissed, and for nearly an hour flying steeds, guided by skillful hands, threaded their way rapidly but fairly by and among the massive representatives of Durham. The display in this first ring (geldings five years and over) was most attractive. More than twenty entries, nearly all roadsters, the exception being one or two Normans and some thoroughbreds. All, however, were trotters, and wheels became invisible, and the air glistened with shining heels, as Membrino, Abdallah, Hambletonian, Golddust and Messengers, hitched to sulkies, buggies, trotting-wagons, and even road-wagons, chased each other in eager emulation around the ring, amid ringing applause and waving kerchiefs. There was, too, in the ring an entry by Gen. Singleton, who in previous years so thrilled the spectators by the exhibition of the flashing speed and gallant style of that prince of show horses, "Silver Heels." The contest was close, but the judges finally awarded both the blue and red ribbons to Taylor, Williams & Hall, of Louisville.

Of geldings four years and under five there were eight entries of very fine animals, the first premium, $30, being carried off by J. V. Schenck, (city), Capt. Schenck, and the second, $10, being awarded to J. F. Spencer, of Lexington, Ky.

Of geldings three years and under four, there were eight entries, including a Legal Tender belonging to Pres. Grant, and Pilot Hutchinson, belonging to J. J. O Fallon. These horses, t ugh winning applause from the spectators, were distanced by their competitors, the blue ribbon being awarded to Prince Arthur, entered by H. Claggett, of Gray's Summit, Mo., and the red ribbon to the entry made by G. W. Wymore, of Farmer City, Ills.

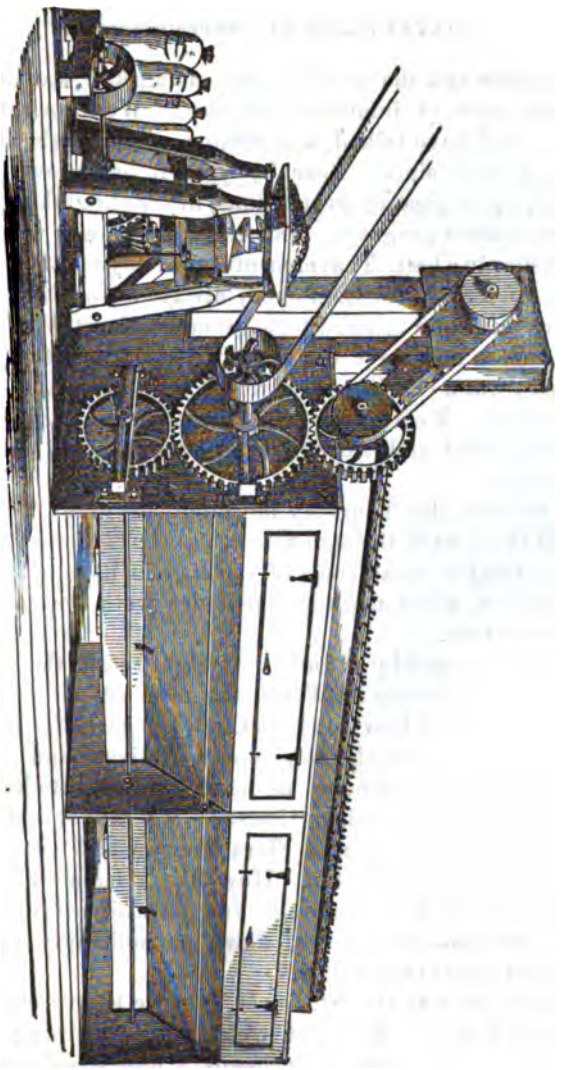
THE TROT FOR THE SOUTHERN HOTEL PREMIUM.

At the conclusion of the display of "geldings of all work," the horses were called to contest for the premium offered by the proprietors of the Southern hotel, for the "fastest trotting horse, mare or gelding that never beat 2:40—a dash of six times around the arena." There were nineteen contestants for the two purses, one of $190, and the other of $100. There was no notable incident in the trial and we give the entries, with the time each made, as follows:

	Time.
A. B. Carson, Kansas City, entered J. S. Young	3:50 3-4
C. J. Voorhies, city, Lize	4:12 1-2
John Jarvis Troy, Ills., Flora	3:59 1-2
J. V. Schenck, city, Pete Payne,	3:59 1-2
Hurd Bros., Ky., Kitty Burgess,	3:51
C. J. Morton, city, Hartford Hambletonian	3:56 1-2
C. J. Voorhies, city, St. George	4:21 1-2
F. C. Smith, city, Blue Casey	4:05 1-4
A. B. Carson, Kansas City, Cora L	3:49 3-4
James Cassidy, city, Pilot Hutchison	3:54 1-2
S. Oglesby, Ills., Maggie May	3:52 3-4
N. J. Colman's Kate Colman	3:51 1-2
T. P. Roach's Gentle Annie	3:56
Pate's Lola Pate	4:08
Rutherford's Annie	4:40
R. S. Carr, city, Annie Belle	4:08

	Time.
Mat Colvin's Nellie	3:48 1-2
R. Lindsey, city, Twyman Maid,	3:56 1-4
L. L. Dorsey's Golddust	4:00

As indicated by the time made, the first premium was awarded to Mat. Colvin's Nellie, and the second to Cora L, entered by Carson, of Kansas City.



PORTABLE FLOUR MILL AND BOLT.—J. HALTEMAN, ST. LOUIS.

FOURTH DAY.

THOROUGH BRED STALLIONS.

DAVID CLARKSON, SUPERINTENDENT.

Fifteen years ago, the writer of this paragraph saw the St. Louis Fair in the days of infantile feebleness. We thought it a great thing then, and have talked, and written, and thought about it as a great thing ever since. Year by year it has grown from small beginnings, up to gigantic proportions, never once taking a backward step in its onward progress. The five years of war was not a retrograde, but simply a halt. That mournful episode past, the St. Louis Fair has made bolder strides than ever; always advancing, always progressing onward and upward to a grander sphere of usefulness and influence. It is no longer the institution of a great city, or even a great State; but a cherished festival of agriculture and the arts, for a whole nation. We acknowledge the pleasure and pride with which we have watched and worked from year to year, for this grand consummation.

As we sit here, this Thursday morning—the great day of the great Fair—and think back through fifteen years of success without a failure, it is natural to recall some of those great days in the history of this institution, when mighty multitudes were drawn together by special attractions.

Without being snobby or tufty, we might recall the day when we lunched with the Prince of Wales, the meanest out of all his good mother's family, and how good old Capt. Harper called him "sonny," as he invited him to the impromptu festival, and how he—the prince—looked a little uneasy as he saw the multitudes who "wore the green." Without being "horsey" we cannot but recall those glorious days of Fashion and Flora Temple, and better than all, of the old partriarch, Lexington. How like a monarch he bore himself, that grand old horse—the sire and grandsire of some of the best stock in America—and looked down patronizingly upon the gay crowd of aspirants in the ring.

Other field days at the St. Louis Fair we have seen, but none to compare with this. At eight o'clock this morning there were ten thousand people on the grounds. Every railroad train and steamer arriving in the last twenty-four hours, has been filled with sitting and standing passengers—at sunrise this morning the street

cars leading to the Fair Grounds began to be crowded—by eight o'clock each car looked like a bee-hive with a swarm just ready to depart—an hour later, every vehicle that could have "Fair Grounds" written or printed on its sides, was pushing its way into the dense and impenetrable throng that crowded all the avenues leading to the grand center of attraction. The departments are impassable, the walks and drives are full; the hundred acres of space is filled with a mighty multitude of sightseers, drawn hither by the fame of the Fair, from every point of the compass, every State in the Union, and almost every civilized country of the globe.

Eleven o'clock finds more than thirty thousand people in the seats and promenades of the new amphitheatre, and yet an increased multitude on the grounds, and crowding, crushing through the departments, and still a mightier crowd filling all avenues leading to the grounds, and pressing through the numerous gates of entry. We risk nothing in saying that there is no parallel to this day in the history of the Fair.

Think of twenty-eight thousand dollars in gate fees for a single day. This was more than the whole week realized fifteen years ago, and then we thought the Fair a grand success. So it was. But all things grow from infancy up to maturity, if they have a tolerable chance; the St. Louis Fair amongst the rest. A grand triumph of fifteen years ago, would be a disgraceful failure now. The unequaled success of to-day may show badly beside the history of this institution in 1881. Hitherto the management of the St. Louis Fair seem to have fully comprehended the spirit of their mission. A settled principle from the first was to make no money for stockholders, but to expend every dollar paid in for stock, for booths, for gate fees, for everything in fact, in enlarging and ornamenting the grounds, multiplying the buildings, and increasing the accommodations for both visitors and exhibitors. Thus far they have kept pace with the public demand; but the present Fair plainly indicates that much greater things must be done in the future. Some of the buildings—the Mechanical Hall, as an instance—are entirely too small for the proper exhibition of the articles that seek a place. Much has to be done in this direction, before the next annual Fair. Then, it is time to take into serious consideration the subject of extending the Fair through at least a fortnight. If Cincinnati can run successfully an exposition of the mechanic arts, and manufactures, for a month, cannot St. Louis keep up the interest of her great exhibition for a single fortnight?

From what we know of the President, Secretary and Directors of the Association, they are equal to the occasion. They will keep up with the public demand for "room, room," and each succeeding year

will witness a still grander triumph. The time is coming, and that shortly, too, when the St. Louis Fair grounds will be one of the finest parks in America, and a universal resort during the spring, summer, and early autumn. The time is coming when it will be to St. Louis what Sydenham Crystal Palace is to London—a place of universal resort—a mode of escaping from the everlasting smoke cloud of a great city, and breathing the fresh, pure, free air of the country. May the Fair Association and the providence of passing events hasten the coming of that good time.

THURSDAY MORNING.

On this great day of the feast, get out of bed as soon as the rosy fingers of dawn draw back the curtains of night to let in upon drowsy earth the golden glimmer of old Sol; hurry through the processes of the toilet, and sally forth into the streets which form the main arteries of the metropolis. It does not seem as if any one had slept at all, the sidewalks are so thronged, the noise and bustle so thunderous in the ear. Omnibuses crammed with passengers from the incoming trains, vex the dull stones with their ponderous wheels; the smaller vehicular conveyances dash hither and thither, each with its quota of humanity, and the detachments of the grand army of infantry push along toward the different rendezvous, good humored, but with a determined look which means business. The steps, vestibules, corridors, and dining rooms of the hotels are fairly alive with guests, hunting something to eat, or flourishing tooth picks as an evidence that the eating is already an accomplished fact, or tasting a fragrant Havana to steady the nerves and assist the machinery of digestion. The restaurants vie with the hotels in their efforts to feed the hungry; the marble and mahogany shrines of Bacchus are lined three or four deep with thirsty souls, who have no appetite until the cobwebs of slumber are washed from their throats with "whisky straight," seductive toddy, sweet-scented julep, or invigorating cock-tail; and the curb-stones and crossings are fringed with newsboys, yelling with proud satisfaction —"Here's your morning papers, all about the great Fair!"—while the boot-black brigade join in the celebrated "shine 'em up" chorus, putting operatic screamers to an open shame.

Unquestionably the town is up and dressed, and shaking hands with its country cousins, who are pouring in by the ten thousand. To do honor to these rural relatives, as well as to assist them in a general jollification, the stores and business offices are closed; the schools have barred their doors, and temporarily dried up the fountains of learning; the offices and workshops have called from labor to refreshment, and in, over and around all, is written in letters so plain that a way-faring man, though a fool, need not misunderstand—"Forward to the Fair!" And so the procession, fed from innumerable springs, and embracing every variety of human kind to be found on the American continent, yields to the common pressure and sets forth for the common center, miles away, where the broad banner, radiant with historic colors, flaunts from the flag-staff of our modern Coliseum.

GOING OUT.

We have nothing to do now with the lucky *creme de la creme* who travel in their own carriages; they are a mere drop in the bucket—we belong to the ocean in which all such buckets are lost and forgotten. Somewhere between Olive street and Morgan, our servants are waiting for us with our five hundred vehicles, any one of which we can have by simply crooking the finger and tapping the pocket. These Jehus are lively fellows with a keen nose for custom, and an itching palm for dimes. They know how, when and where the Fair crystallizes, and gather at the points specially selected for that interesting chemical operation.

ON THE GROUNDS.

To see the Fair, Thursday is the worst day of the week; to see the people who make the Fair, it is undoubtedly the best—for from time immemorial, that day has been set apart and dedicated to the grand rally and rush of the million. From town and country, from near and far, from the highways and byways, from the lanes and hedges, from chateau and cellar, from frame cottage and marble front, from alley and avenue, from the dwellings of the rich and the abodes of the poor, from every place where men and women hang themselves up on the peg of life, the delegates to this monster convention, sacred to agriculture, and art swarm forth. The magnetism which manufactures crowds draws them hither—certainly nothing else, for the attendance is too much of a good thing to admit of real enjoyment. All who come understand this fact, and yet feel it incumbent to go through the motions of sight-seeing. The first place of attack is generally Fine Art Hall, and the individual who can successfully shove himself or herself through that locality and observe anything but the backs of those in front, must be as tall as the main-mast of a man-of-war, and have eyes as strong as a twelve-lens opera-glass. We made the attempt, and brought up standing against a female of ample dimensions, who had taken a position in front of a dry-goods show-case. In that show-case is a camel's hair shawl, valued at the exceedingly low price of $8,000. This article evidently appealed to the sensibilities of our unknown lady friend, and with hands on hips she stood and stared at the masterpiece of India's looms. At last the lips parted, and the oracle spoke: "Well, I'll declare, they ask $80 for that there shawl, and my Nancy bought a prettier one at Mr. Jones' shop in Bungtown for $6 50, and paid for it in garden truck!"

All through the long, long autumn day, from morn till dewy eve, the throng flowed backwards and forwards among the pictures, plants, sewing-machines, pianos and bedquilts, occasionally oozing out into the old amphitheatre, listening to the music, watching the flash of the tiny fountains, and resting the tired vision on the dusty mat which is supposed to represent green grass. And everywhere else there was a similar crowd going through a similar performance, music, fountains and grass omitted. The big engines had a noble audience, the little engines also; the Cotton parlor was stuffed with visitors; not a hen could lay an egg, or cock crow on account of company; the hogs were punched and poked until the heaviest of them thought it was a great bore; the bulls were bedevilled in a style that would have made Wall street blush; the row of cooking stoves was surrounded by a cordon of inquiring minds, who appeared as curious to examine the mysteries of baking as if a miracle were lodged in the cast iron bellies of these kitchen gods; the lightning rod temple had more devotees than the altar of Juggernaut ought to have; the wind-will had as many listeners to its eternal clatter as though it were Parepa singing an anthem in praise of little Rosa; the bells assembled larger congregations than ever go to church in this degenerate era; and the belles done up in crinoline walked their beaux until masculine legs were at an awful discount.

THE AMPHITHEATER.

This, after all, is the magnet whose subtle influences none can resist; the pulse, too, by which we can measure the beatings of the Fair's colossal heart. And so whenever the enthusiasm runs high, and the climax of the week calls forth an innumerable host, it is to the amphitheater you must go to procure the choicest and completest picture for memory's gallery. We thought last year that the place was crowded to its utmost capacity, but yesterday convinced us of our error, by showing what the immense structure can contain when put to the supreme test. From noon until nearly five o'clock, there was literally not a vacant seat in all the long ranges of benches; every inch of space was occupied, even where the sun blazed straight with the faces of the spectators; and at the same time the passage way next to the arena, the openings left for exits and entrances to the ring, the broad corridors above, the steps leading to it, the promenade beneath—all were

overrunning with people. It is a low estimate to say that at the time mentioned there were under the roof of the amphitheatre at least forty thousand people. Standing at the rail which protects the upper tier of seats, and looking right and left around the majestic circle, was a sensation to last a lifetime. No description can do it scantiest justice—the bright faces, the brilliant costumes, the sparkling eyes, the nodding plumes, the fluttering drapery of the ladies, mingling and blending with the plainer garb of the masculine creation, and the whole heaving in perpetual motion as the sports below thrilled each member of the grand audience with emotions of delight, reminded one of the ever-varying tints of a gigantic kaleidoscope. Add to these the soft October air throbbing with delicious music, the golden haze filling the vault of heaven with a sea of shimmering glory, and the tumultuous roar of the multitude on every side, sounding like the voice of the ocean when roused to madness by the lash of the tempest—and here are the materials of the sketch before which we lay down our pencil in despair.

If Thursday was a great day in Fair annals as to the numbers attending, it was scarcely less so as to the exhibition presented in the arena. From causes heretofore specified, a number of "rings" in the programme of Wednesday had been carried over, and the Superintendent was forced to call into the arena at one time a half dozen classes; grouping in one view thoroughbred horses, roadsters and plow horses, as well as short-horn, Devon and other fine breeds of cattle, and among these, showing the marvellous adaptation of steam to the work heretofore assigned to the brute creation, there came in the road-steamer, with its rattle and rumble, its uncouth form and marvellous manageability. Then, too, there was a holiday parade of citizen soldiery, a most exciting trial of speed, and a superb exhibition of equestrianism. With these attractions presented, it was no wonder that the seats of the amphitheater were almost filled as early as ten o'clock, were crowded at twelve, and literally jammed full an hour later.

THE DEFERRED RING—HORSES OF ALL WORK.

The exhibition began with the entry of mares of all work, of which six classes had been deferred from the previous day. These various classes brought into the arena the finest horses in the West, and as nearly every one was a roadster, and as in classes there were from fifteen to twenty entries, the scene was often most animated, and at all times brilliant and exciting. Scarcely a famous strain of trotting blood, from the descendants of Messenger to the progeny of Morgan but was represented, and Abdallahs, Hambletonians, Grey Eagles, Mambrinos, etc., contended in emulous strife for plaudits showered most lavishly by a gratified audience. Where there was so much to commend, it would be invidious to particularize, and as at most the test of merit is success, we give the entries and awards as follows:

Mares (breeders), entries: J. J. O'Fallon, St. Louis; Pres. U. S. Grant, "Tousey" and "Jennie;" Alex. Kelsey, St. Charles, four entries; J. V. Schenck, St. Louis, "Roxiana;" E. Dillon & Co., Normal, Ills., five entries; W. M. Tipton, Odin, Ills.; E. S. Wadsworth, Chicago; Robt. Pipkin, St. Louis; Hunt Bros., Lexington, Ky.; Gen. J. S. Cavender, St. Louis, by G. Weedman, Farmer City, Ills., and J. F. Spencer, Lexington, Ky. The awards were: First premium, $75, J. T. Spencer, Lexington, Ky.; second, $35, Alex Kelsey, St. Charles, Mo.

Mares five years old and over. Entries: Thompson & Gillespie, J. L. Patterson, J. J. O'Fallon, Thos. Ferguson, C. J. Voorhees, C. M. Seaman and John Finn, St. Louis; W. M. Tipton, Odin, Ills.; G. P. Davis, Bloomington, Ills.; C. T. Dunnell, Carlisle, Ills.; N. Greene, Greene county, Ills.; A. D. Carson, Kansas City; Jno. Jarvis, Troy, Ills.; W. B. Crabb, Eminence, Ky., and R. L. Keene, Boone county, Mo. The awards were: First premium, $75, to W. B. Crabb, of Kentucky; second, $35, to Jno. Jarvis, of Ills.

Mares four years and under five. Entries: J. J. O'Fallon, St. Louis; Wm. M. Tipton, Odin, Ills.; N. Greene, Greene county, Ills.; Dr. G. R. Buckner, St.

Charles; E. G. Pratt, St. Louis; Taylor, Williams & Hall, Louisville, two; J. S. Spencer, Lexington, Ky.; T. C. Graves, Petra, Mo.; Geo. Weedman, Farmer City, Ills. The awards were: First premium, $50, Taylor, Williams & Hall; second, $25, T. C. Graves.

Mares three years and under four. Entries: J. F. Quissenberry, St. Louis, two; E. Dillon & Co., Normal, Ills.; G. P. Davis Bloomington, Ills.; J. L. Keckling, Bloomington, Ills.; Taylor, Hall & Williams, Louisville; Hubbell & Quarels, Columbia, Mo.; T. C. Graves, Petra, Mo.; L. L. Dorsey, Ky. The awards were: First premium, $30, T. C. Graves; second, $15, Hubbell & Quarles.

Mares two years old and under three. Entries: J. F. Quissenbery, St. Louis; W. B. Dorsett, St. Louis; E. Dillion & Co., Normal, Ills.; E. S. Wadsworth, Chicago; L. Salisbury, Chariton, Mo.; Jno. Oliver, St. Louis; J. J. O'Fallon, Gen. J. S. Cavender, do.; A. J. Garland, St. Charles; H. A. Robinson, Edwardsville, Ills.; S. Kennan, Columbia, Mo.; P. H. Dorsey, Bunker Hill, Ills.; Alex. Kelsey, St. Charles. The awards were: First premium, $25, to L. Salisbury, of Chariton county, Mo.; second, $15, P. H. Dorsey, of Illinois. The Salisbury entry was a beautiful brown filley of Ethan Allen stock, that, though never handled until this spring, has already trotted in 3:15.

Mares one year and under two. Entries: U. S. Grant, two; J. V. Schenck, E. Dillon & Co.. Normal, Ills.; E. S. Wadsworth, Chicago; H. Stevemeier, St. Louis; P. H. Dorsey, Illinois; Alex. Kelsey, Missouri. Both premiums were awarded to Pres. U. S. Grant.

Mares under one year. Entries J. V. Schenck, St. Louis; E. Dillon, Normal, Ills., three; Pres. U. S. Grant, two; Alex Kelsey, St. Charles. First premium, $10, J. V. Schenck; second, $5, Pres. U. S. Grant.

THE SHORT HORNS.

The classes of cattle carried over from the preceding day, comprising the sweepstakes for bulls and cows and for herds of any age, were shown in the arena at the same time that the horses of all work were being exhibited. As the appearance of these animals in the ring was described yesterday, we merely give the entries and awards, the prizes being all carried off by the short horns.

For the $350 to be awarded to the best bull of any age or breed, the entries were by B. F. Ketchum, of East Tennessee, who presented "Young Wellington," and "Duke of Marble Hall;" J. J. O'Fallon, of St. Louis, "Billy;" S. Dunlap, of Jacksonville, Ills., "2d Duke of Arden;" Pres. U. S. Grant, "Holstien;" Geo. M. Bedford, of Paris, Ky.. J. H. Pickerell, of Harristown, Ills., with "Baron Booth of Lancaster," and "Baron Lewis;" B. F. Bedford, of Paris, Ky., two entries; A. W. Almon, Salem, Ills.; T. W. Ganard, of Martinsburg, Mo., "Red Duke;" J. Whittaker, St. Louis; J. H. Kissenger, Clarksville, Mo., two entries; H. Larrimore, Fulton, Mo., two entries; C. L. Hunt, St. Louis; Collins & Sessions, Gilead, Mo., "New England." The first premium, $200, awarded to Jeff. Bridgeferd, and the second, $150, to J. H. Kissenger.

The display of best cow of any age or breed, was equally fine, the entries being those of B. F. Ketchum, of East Tennessee, "Hope 10th;" S. Dunlap, Jacksonville, Ills., "Diana," "Western Lady," and "Roxey;" Pres. U. S. Grant, St. Louis, "Holstein;" G. N. Bedford, Paris, Ky., three; J. H. Pickerell, Harristown, Ills. "Bride 15th," "Lowan Hill 2d and 3d;" A. Shropshire, Paris, Ky.; F. Shropshire, Centreville, Ky.; A. W. Almon, Salem, Ills.; W. S. King, Minnesota, eight entries; E. Iles, Illinois, four; J. H. Kissenger, Mo., four; Jeff. Bridgeford, Paris, Mo., two; Collins & Sessions, Gilead, two. The first premium, $100, awarded to A. Shropshire, of Kentucky, and the second, $75, to J. H. Kissenger, of Mo.

The display of herds of any age or breed was exceedingly fine, King, of Minnesota, entering three; and J. J. O'Fallon, St. Louis; S. Dunlap, J. H. Pickerell, and Edward Iles, of Illinois; and J. H. Kissenger, and Jeff. Bridgeford, of Missouri, one each. The first premium was

$150, awarded to J. H. Pickerell, and the $50, second to S. Dunlan.

For the best herd of cattle one year or under, the exhibitors were Pres. U. S. Grant, Geo. M. Bedford, of Paris, Ky., J. H. Pickerell, A. W. Almon, J. Chorn, and Edward Iles, of Illinois, and J. H. Kissenger, of Clarksville, Mo. The first premium, $75, awarded to A. W. Almon, of Salem, Ills., his entry being a herd lately purchased of A. Shropshire, of Kentucky—and the second, $50, to Geo. N. Bedford, of Paris, Ky.

THE SADDLE HORSES.

The exhibition of saddle horses was of remarkable excellence. The entries comprising as they did steeds of the finest blood in the country, ridden by such elegant masters of eqestrianism as the son of S. S. Grant, (who this day met worthy competitors) made up a display of unequaled interest. Noteworthy among the entries were the "Arlington Denmark," from Kentucky, the stallion shown by Vivian, of Brown county, Mo. Every one of the entries in the gelding ring and the Grey Eagle mare owned by Jas. C. Edwards, of this city; the black owned by B. W. Alexander, Judge Bastine's fine mare, and the elegant animal from Kentucky that took the red ribbon in the mare class. All these horses were broken thoroughly to the "five gaits," and wheeled and curvetted, raced at full speed, traversed the grounds at a stately walk, as it seemed, at the mere will of the holder of the reins—rider and horse appearing as one.

In the stallion ring there were but four entries, and the blue ribbon, $75, awarded to Callaway & Ireland, of Eminence, Ky., "Arlington Denmark;" and the second, $25, to a black entered by David Vivian, of Boone county, Mo.

Of saddle geldings of four years and over, there were nineteen entries, and in this class the first premium was awarded to "Mark Twain," shown by C. Cannon, of Columbia, Mo., and the second to an entry made by Callaway & Ireland, of Eminence, Ky.

Of saddle mares there were nine entries only. The first premium, $50, awarded to a "Grey Eagle," entered by J. C. Edwards, of this city, and the second, $25, to Callaway & Ireland, of Eminence, Ky.

PRIVATE PREMIUMS—TANDEM TEAMS.

Although tandem teams are scarcely naturalized here as yet, the offer of a private premium brought out a very creditable display. Mr. J. L. Patterson, driving in a very neat team—a brown and a bay; Mr. N. D. Noyes entering a fine pair of bays—"Beauty" and "Saadi," full brothers and Black Hawks of Ethan Allen and Green Mountain Morgan descent; Miles Kehoe a stylish pair of greys; and Moore & Hayden, of Kentucky, an elegant pair of browns. All of the teams were handled with consummate skill, and as they were driven around the ring were greeted with hearty applause. The judges awarded the premium, $50, to the team entered by Taylor, Williams & Hall.

The premium offered by the Industrial Plow Company for the best team for farm purposes, was contended for by three entries, for Norman horses made by E. Dillon & Co., of Illinois; two of the same blood entered by Jas. A. Clifton, of Illinois; and entries made by T. Helms, of Belleville, Ills.; H. M. Glasson, of Tallula, Ills.; Taylor, Williams & Hall, of Kentucky, and J. W. Bennett, of Fulton, Mo. The premium—a plow valued at $100—was awarded to Taylor, Williams & Hall, of Louisville, Ky.

AN EPISODE.

In the arena was the entry of the first battallion of Missouri militia. To this reminder of grim war, the wheeling horse, the death-dealing artillery, and the stern light infantry, the audience gave a kindly greeting, viewing with interest the precision with which the evolutions were made, and soldierly bearing of the men.

THE GREAT TROT.

The grand feature of the exhibition in the amphitheatre was the great trot for premiums, amounting to $1,350—the first being $1,000 for the fastest trotter, an immense audience was crowded together in

a high state of expectancy long before the arena was ready for this ring. A vast wall of faces like a solid masonry encircled the whole area, leaving not a seat to be seen.

As indicated by the record, the first premium of $1,000 was awarded to Carlin's entry, (Lew W. H. Wright's "Ella Wright"); the second, of $250, to Peter Lindell's "Pilot Junior," and the third of $100, to R. S. Carr's "Tackey." As six times around the ring—the distance trotted—is said to equal one and a half miles, the time of the winnef of the grand prize is equal to 2:31.

THOROUGH BREDS AND ROADSTERS.

The trot was evidently considered by the audience the "piece de resistance" of the feast, furnished forth by the Fair Association, as at its conclusion the throng began to leave the amphitheatre, only a thousand or two remaining to witness a very fine exhibition of roadsters. The thorough bred stallions fared scarcely better, though shown while the amphitheatre was thronged, as then the attention of everyone was absorbed by the trotters. Few of the audience noted the fine form of "Phaeton," the stallion imported by Ten Broeck, of Kentucky—the sire of most of the winners in England this year, and himself, we believe, a former winner of the "Derby"—or the elegant proportions of "Skedaddle," or the descendants of "Planet," "Lexington," "Uncle Vic," or a score of other noted winners on the American turf.

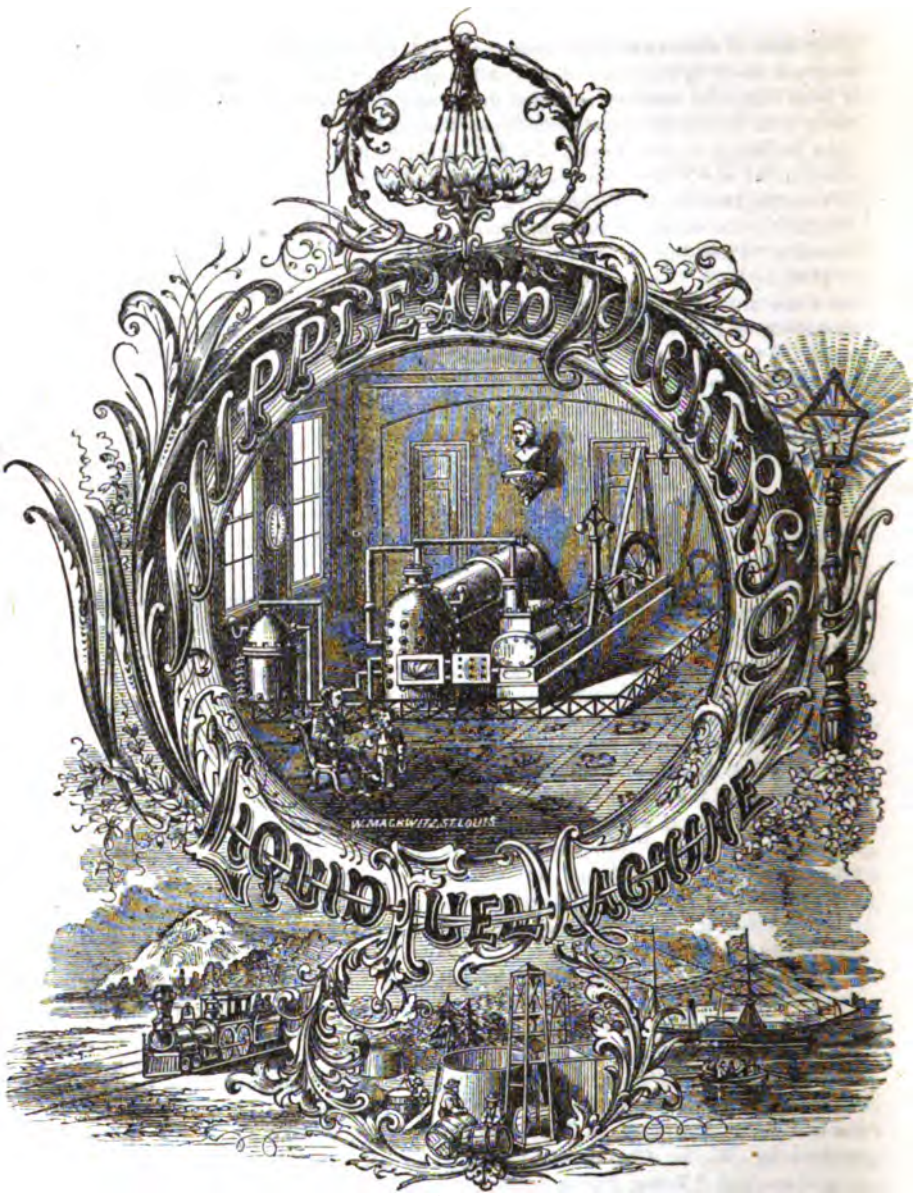
The first "ring" of thoroughbred stallions, five years or over, was comprised of "Phæton," entered by R. Ten Broeck, of Kentucky; a Planet and a Lexington, entered by James J. O'Fallon, of St. Louis; "Skedaddle," entered by Taylor, Williams Hall, of Kentucky; a Lexington, entered by W. L. Challis, of Atchison, Kas., and "Young Fiscoe," entered by Peter Bougher, Summerfield, Ill. The first premium, $300, was awarded to Ten Broeck's "King Tom;" the second, $100, to J. J. O'Fallon's "Planet," and the third, $50, to "Lexington."

Of thoroughbred stallions four years and under five, by Jas. J. O'Fallon, of St. Louis, F. C. & T. Daniels, of Carlisle, Ills., and by J. A. Reavis, of St. Louis. The first premium, $100, was awarded to Jas. J. O'Fallon.

Of one year olds, there were entries by Jas. J. O'Fallon, who showed two "Pat Malloy" colts, and by P. H. Dorsey, of Ills. Both premiums were awarded to O'Fallon. First premium, $30; second, $15.

Of thoroughbred stallions under one year, there were but two entries, those of Charles L. Hunt, of this city, who showed colts, "Uncle Vic" and "Gen. Longstreet." These were so excellent that both the blue and red ribbon were awarded to Mr. Hunt. First premium, $20; second, $10.

The exhibition in the ring was closed by the showing of roadster geldings five years old and over. This brought out a really fine ring of horses, as will be noted by the entries below, but there were only a few remaining to witness the bursts of speed shown, and at its conclusion the amphitheater was virtually deserted. The entries were: A. B. Wakefield's "Grey Eagle;" N. D. Noye's "Young Ethan;" Hubbell & Quarles, of Columbia, Mo., two entries; L. L. Dorsey, of Louisville, Ky.; Johnson & McPike, of St. Louis; John Jarvis, of Troy, Ills.; J. C. Kelly, of St. Louis; J. F. Spencer, of Chileisburg, Ky.; Jas. T. Nichols, of Cynthiana, Ky.; W. M. Tipton of Odin, Ills.; "Messenger," N. F. Kehoe, of St. Louis, D. A. Sutton, St. Louis; W. H. Holly, of Eminence, Ky.; J. B. Neill, city; Geo. F. Cochnower, city; J. P. Wright, Alton, Ills.; H. W. Glassen, Tallula, Ills.; J. V. Schenck, of St. Louis, and by A. D. Carson, of Kas., two entries. The first premium, $150, was awarded to Taylor, Williams & Hall; the second, $50, to J. V. Schenck, and the third, $50, to T. P. Roach's "Billy Hoskins."



THE LIQUID FUEL MACHINE.

This wonderful apparatus of Whippl e& Dickerson's was a six day's wonder at the Fair, and well it might be. Without wood, without coal or coke, without smoke or sparks, it produced heat sufficient to run the whole Machinery Department. This wonderful machine owes its great economy and efficiency to the circumstance that it can "set a river on fire;" that is to say, it decomposes water, and the two elements, hydrogen, a combustible, and oxygen, a promoter of combustion, are set free to unite their energies with the almost similar elements of kerosene oil, and these combined produce a most intense heat and a vivid light. It would be difficult to over estimate the immense advantages to be derived from this wonderful invention.

FIFTH DAY—FRIDAY.

HORSES AND MULES.

DAVID CLARKSON, SUPERINTENDENT.

Last night the heavens wept in pity over the poor, parched earth, and this morning the tears are are running off in little rills, or standing here and there in pools and puddles. Some have the assurance and irreverence to say that the sprinkling contractors got up a corner with the weather clerk, to make money and save horse flesh. However that may be, the world rejoices in a glorious sprinkle. How it came down in the middle of the night, patter, patter, pattering upon the roofs, washing the accumulated dust of forty days from the foliage of all the trees in garden, orchard, lawn or forest. How like a glorious Providence it came down upon the walks, and drives, and trees, and lawns, at the Fair Grounds. Every thing looks bright and beautiful this morning. The trees have their dusty coats, and although they cannot resume the green of May, have taken the more gorgeous tints of autumn crimson, yellow, purple and gold—all the hues of the rainbow are here, not so much the work of the frost fiend, as an effort of nature to look glorious in the hour of death. Down by the lake the parterres of flowers look so bright and happy, and in that, here and there, the poor parched, dry, shrivelled, well trampled grass is absolutely trying to look green.

The grand pendulum of the Fair swings slowly up to Thursday, touches there its highest pitch, and then begins to decline toward the final stopping point of Saturday. The enthusiasm, or call it what you will, which brings an hundred thousand people to the grounds on a single day cannot possibly last more than twenty-four hours, nor would it be well, perhaps, if it could; but one or two facts may be mentioned *en passant*, that will give the public a clearer idea than they have yet had of what this enthusiasm accomplishes. Among the distinguished visitors present Thursday was a gentleman well known in St. Louis, who, during a lengthened sojourn in Paris, some years since, attended several times the famous Longchamps races, in which the Emperor Napoleon took especial pride, and which he aided to the utmost with imperial influence and imperial cash. All Europe, it was said, went to Longchamps, and yet our informan tells us that the crowd there gathered bore no sort of comparison to

the throng which made the crowning episode of the Fair of 1871. The same gentleman twice visited the Derby races of England, the fete *par excellence* of the British empire, and this, too, fell far short of the standard which we have erected. A tourist just returned from abroad, took Russia in his round of travel, and improved the opportunity to see the great Fair at Novgorod, the largest in the Eastern hemisphere; drawing together, as it does, Europeans and Asiatics from every section of those countries for purposes of international trade. But, according to the statement of this gentleman—who, by the way is too much of a cosmopolitan to be led astray by prejudice or partiality—Novgorod may hide its diminished head in the presence of St. Louis.

AMPHITHEATRE.

There was of course not the great mass of people at the amphitheatre yesterday that graced it on the day previous. People sometimes visit fairs to see others as well as be seen themselves, and hence Thursday last, with its eighty to a hundred thousand people, was the great day and occasion of the Fair, as was expected. Yesterday the attraction was fully as great, but the people were not there to enjoy it to the same extent, or at least the same capacity.

Among the fine stock in the arena during the day there were noticeable; Col. Norman J. Colman's Abdallah mare Kate; John Jarvis' splendid dark brown Morgan mare; Spencer's gray Messenger mare; Hon. Dick Lancaster's blood bay mare, Hambletonian, one of the finest roadster animals in the State, and also a beautiful sorrel mare, by Morgan Hunter, Con Morgan's bay mare, "Blue Cary," by Duroc, a half thoroughblood, and Jas. J. O'Fallon's "Butterfly." Revelette, out of an Arabian mare, beautifully marked, was also pleasurably noticed. Alex. Kelsey's bay mare "Maud," by Mat. Davis, was noticed also on account of its having taken a number of premiums before. Hunt Brothers' "Kitty Burgess," by Grey Diomed, out of a bald stocky mare, was also a favorite. In the roadster ring, registered four and under five years, could be seen "Geo. Highlander," owned by J. A. Reavis, of this county, a mahogany bay, sired by Knight of St. George, dam Sue "Highlander." Callaway & Ireland's bay "Tarleton," by Golddust, Geo. Weidman, by Capt. Island, out of a thoroughbred mare, and John Minckler's chestnut mare by Sir Archer, out of Kentucky Whip, a full, stylish thoroughbred. All had their friends, and were among the attractions of the arena.

MULES.

Pair Mules, for farm.—1st. prem. $30, F. J. Barbee, Paris, Ky.; 2nd. prem. $15, F. J. Barbee, Paris, Ky.

Matched Mules, for carriage (8 entries). 1st. prem. $20, F. J. Barbee, Paris, Ky.; 2nd. prem. $15, H. McGlassen, Tallula, Ills.

Mare Mules, 3 years and over (10 entries).—1st. prem. $20, F. J. Barbee, Paris, Ky.; 2nd. prem. $10, P. Hardin, Louisiana, Mo.

Horse Mules, 3 years and over, for saddle.—1st. prem. $20, B. B. Vance, Vandalia, Ills.

Horse or Mare Mule, for saddle (12 entries.—1st. prem. $20, H. Schuler & Co., St. Louis.; 2nd. prem. $10, January & Edwards, St. Louis.

Horse or Mare, for buggy.—1st. prem. $20, Jas. Reilly, St. Louis; 2nd. prem. $10, W. M. Miller, Elleardsville, Mo.

ROADSTERS.

Geldings, under 5 years.—1st. prem. $50, Callaway & Ireland, Eminence, Ky.; 2nd. prem. $25, J. F. Spencer, Chilesburg, Ky.

Mares, 5 years and over (25 entries).—1st. prem. $100, W. B. Crabb, Eminence, Ky.; 2nd. prem. $50, J. F. Spencer, Chilesburg, Ky.

Mares, 4 years and under 5 (9 entries). —1st. prem. $50, Taylor, Williams & Hall, Louisville, Ky.; 2nd. prem. $25, T. C. Graves, Petra, Mo.

Mares, 3 years and under 4 (12 entries). —1st. prem. $50, T. C. Graves, Petra, Mo.; 2nd. prem. $20, Taylor, Williams & Hall, Louisville, Ky.

Mares, 2 years and under 3 (14 entries). —1st. prem. $30, L. Salisbury, Chariton countv, Mo.; 2nd. prem. $15, P. H. Dorsey, Bunker Hill, Ill.

Mares, under 2 years.—1st. prem. $25, Pres. U. S. Grant, Washington, D. C.; 2nd. prem. 210, P. H. Dorsey, Bunker Hill, Ill.

The above mentioned class of roadsters were from the deferred list of Thursday, and the judges, in their awards, were specially instructed to pay strict attention to size, form, action, style, endurance and qualities necessary for the road, and not to award premiums alone for speed. All animals over three years old were required to be exhibited in harness.

THOROUGHBRED MARES.

Mares, 4 years and over.—1st. prem. $75, Jas. J. O'Fallon, St. Louis; "Imported Yorkshire;" 2nd. prem. $40, C. L. Hunt, "Plover Wing," Normandy, Mo.

Mares, four years and under 5 (not bred).—1st. prem. $75, W. M. Tipton, Odin, Ills.

Mares, 3 years and under 4.—1st. prem. $50, Jas. J. O'Fallon, St. Louis; 2nd. prem. $25, E. Davis, Bennett, Ills.

Mares, 2 years and under 3.—1st. prem. $40, J. W. Dilley, Quincy, Ills.

Mares, 1 year and under 2.—1st. prem. $20, E. S. Wadsworth, Waukegan, Ills.; 2nd. prem. $10, Jas. J. O'Fallon, St. Louis.

ROADSTERS.

Mares, under 1 year.—1st. prem., Jas. J. O'Fallon, "Pat Malloy," $20; 2nd. prem. $10, C. L. Hunt, "Longstreet."

Stallions, 5 years and over (14 entries). —1st. prem. $800, Callaway & Ireland, Eminence, Ky.; 2nd. prem. $100, Muir Hayden, Lexington, Ky.

Stallions, 4 yrs. and under 5 (4 entries). —1st. prem. $50, L. L. Dorsey, Louisville, Ky.; 2nd. prem. $25, J. A. Reavis, St. Louis.

Stallions, 3 years and under 4 (12 entries). —1st. prem. $50, Muir & Hayden, Lexington, Ky.; 2nd. prem. $20, P. H. Dorsey, Bunker Hill, Ills.

Stallions, 2 years and under 3 (12 entries).—1st. prem. $40, L. L. Dorsey, Louisville, Ky.; 2nd. prem. $20, S. Kennon, Columbia, Mo.

Stallions, under 2 years.—1st. prem. $25, Geo. Weidman, Farmer City, Ills.; 2nd. prem. $10, S. Kennon, Columbia, Mo.

EXTRA PREMIUM.

Saddle Horse, mare or gelding.—1st. prem. $20, E. M. Bass, Columbia, Mo.

THE THREE MINUTE PREMIUM.

There were some twenty-six entries for competition under this head, and from among the best stock in the State or country. The call was for the fastest trotting horse, mare or gelding, that has never beat three minutes in public. The first premium was $100, and the second $25. A dash, six times around the arena, was the requirement. The contest occupied most of the afternoon, and was the grand source of attraction. We noticed the following entries:

J. L. Patterson, Jas. O'Fallon, W. H. Stark, C. J. Voorhees, Jno. Minckler, F. S. Bartram, Joe. Whittaker, and Jno. Finnegan, St. Louis; Jas. T. Nichols, Cynthiana, Ky., 2 entries; Bassett & Bros., Middle Grove, Mo.; G. F. Cochnower, St. Louis; S. Ogelsby, Ridge Prairie, Ills.; J. R. Race, Decatur, Ills; Jas. Cassidy, St. Louis, 2 entries; James Rutherford, Edwardsville, Ills.; F. C. Graves, Petra, Mo.; J. H. Smith, St. Louis; Jno. Jarvis, Troy, Ills.; Jacob Gilbert, Fulton, Ills.. J. R. Matthews, Edwardsville, Mo.; G. W. Wymere, St. Louis; Alex. Kelsey, St. Louis, 2 entries; M. Colvin, St. Louis; T. P. Roach, St Louis; Robt. S. Carr. St. Louis; A. W. Brown, Collinsville, Ills.; Hubbell & Quarles, Columbia, Mo.; N. J. Colman, St. Louis; A. D. Carson, 2 entries, and W. D. Parish.

The first premium, $100, was awarded to S. Ogelsby, of Illinois, and the second, to Matt. Colvin, of St. Louis.

SIXTH DAY—SATURDAY.

HORSES AND MULES.

DAVID CLARKSON, SUPERINTENDENT.

And now comes "the last great day of the feast," more glorious in sunlight and genial warmth, and heavenly beauty, than any of its predecessors. The golden haze that hangs about the horizon, looks like the harbinger of that grand Sabbath of the year—Indian summer—the period when nature rests awhile from her consummated task, and bids her children to rejoice in the full fruition of the completed year.

We feel disposed to imitate mother nature to-day, and fall into the *dolce far niente* mood; to look about at our leisure and see some of the wonders of this grand exhibition. As yet we have only seen "men like trees walking," a kind of kaleidoscopic view of the wonders of the Fair, but have no clear and distinct impression of anything.

To-day the sight-seers will have comfort and satisfaction in going through the various departments. Most of the week it has been a great struggle and crush, humanity of every age, sex, color and condition, forcing itself along through the aisles, never able to stop for the careful examination of a particular object, because other waves of humanity pressed them forward; and so on and on, and still onward the stream flowed. To-day there is a fine attendance, better than any Saturday before, but room enough everywhere in the various departments to see all that is to be seen.

And to-day ends the exhibition for 1871. What has been the result of this grand pageant, that had attractions enough to draw together a hundred thousand people, from every point of the compass, and almost every country on the globe? Is it a mere idle show to tickle the fancy of sight-seers, and be forgotten like the passing picture of a panorama, or the rainbow glories of the kaleidoscope? Far from it. The St. Louis Fair teaches a lesson of grand significance to every visitor. It tells him that "the world moves." It shows him a thousand new applications of the science of mechanics. It proves to him that the civilization of the nineteenth century looks onward and upward to higher achievements than have ever been dreamed of before. It shows him how one man's power can be increased to that of ten, twenty or a hundred. It brings him into contact with all the latest improvements in machinery and the mechanic

arts. It makes him acquainted with all the finer varieties of stock, from a thoroughbred chicken, worth five dollars, all the way up to a thoroughbred horse worth from five to fifty thousand. After spending a day or two here, with his eyes wide open, he will go home a wiser if not a better man. Let us hope that there may be no adverse circumstances or sinister influences, but that the St. Louis Fair shall fulfill its great mission for years and generations to come.

The Fair winds up in transcendent glory, without dust, and with thousands upon thousands of happy visitors. Some exhibitors have been disappointed; what of that? Who ever saw a contest without some disappointed aspirants? We believe that the President and Directors of the St. Louis Fair are honest and most honorable men. We do not believe that there has been the slightest opening for bribery or fraud. If there is an institution of the kind in the world that gives its premiums without fear or favor, we think the St. Louis Fair is of that description. Hundreds of animals, and articles in every way worthy of high commendation, passed through the ordeal without even a notice. Why is this? Simply because so many excellencies of each class presented themselves, that nothing could be done but to select the best, in the judgment of the committee, and leave all the others alone. With the winding up of this great annual festival, we feel inclined to moralize. There have been

A HUNDRED THOUSAND STRANGERS

in St. Louis this week, drawn together from twelve great States of the West and Southwest. These men and women, whether they came from Virginia or Texas, are brothers and sisters, every one. Their interests are identicle, and you might as well think of making the geat Mississippi disperse its accumulated floods as to talk of division in this grand empire of nature, hemmed in by mountains and traversed by mighty floods. When you can separate the soil of twenty great States and Territories, dissolved in the waters of the Mississippi, it will be time enough to talk of dissension or disunion in the Mississippi Valley. We are one people from the Atlantic to the Pacific, and we are doubly one from the Alleghanies to the Rocky Mountains. In its social and political influence the St. Louis Fair is

THE GRANDEST INSTITUTION

in America. Here come together, from year to year, representative men from a score of great States. They do not come together to quarrel, but rather to strike hands and unite hearts in the prosecution of every good and great enterprise. In this respect alone the St. Louis Fair has been, and will continue to be, of incalculable value to the whole country. May it remain forever, not only as the glorious exponent of the agricultural and mechanical wealth of the Great West, but as a noble conservator of all we hold dear in our social and political systems.

THE AMPHITHEATER.

The closing day of the Fair at the amphitheater had far more than its usual attraction for the last day. During the morning there was a somewhat meagre attendance, but it gradually increased until three o'clock, when the vast seating capacity was about two-thirds full. Mules, jacks and jennets, horses, boys' riding, and the mule race made up the programme of the day, with nine rings in the two first mentioned. Superintendent David Clarkson, with his corps of assistants, were as busy as men could be in the discharge of their duties.

Best Pair Mules.—1st. prem. $100, F. J. Barker, Paris, Ky.; 2nd. prem. $50, H. W. Glassom, Tallula, Ills.

Best Horse or Mare Mule.—1st. prem. $50, F. J. Barker, Paris, Ky.; 2nd. prem. $20, F. J. Barker, Paris, Ky.

Best Jack.—1st prem. $100, C. Everhard, Sturgeon, Mo.; 2nd. prem. $50, J. F. Quissenbury, Bridgeton, Mo.

Best Jennet.—1st. prem. $75, Michael Lee, New Florence, Mo.; 2nd. prem. $20, Michael Lee, New Florence, Mo.

Best Stallion (40 entries).—1st prem. $300, Callaway & Ireland, Eminence, Ky.; 2nd. prem. $100, R. Ten Broeck, Louisville, Ky.

Best Mare (35 entries).—1st. prem. $100, J. F. Spencer, Lexington, Ky.; 2nd. prem. $50, Taylor, Williams & Hall, Louisville, Ky.

Best Gelding.—1st. prem. $100, Taylor, Williams & Hall, Louisville, Ky.; 2nd. prem. $25, Taylor, Williams & Hall, Louisville, Ky.

Best Sucking Colt.—1st. prem. $50, Pres. U. S. Grant, Washington, D. C.; 2nd. prem. $25, Alex. Kelsey, St. Louis.

Best Draft Horse, Mare or Gelding.—1st. prem. $100, E. Dillon & Co., Normal, Ills.; 2nd. prem. $50, E. Dillon & Co., Normal, Ills.

HORSES AND MULES.

Riding Ponies, (52 entries).—1st prem. $25, Granville Bailey, Kentucky; 2nd. prem. $10, Jno. M. Pautre, Atlanta, Ills.; 3rd. prem. $5, Dickey Weidman, Farmer City, Ills.

Mule Race (10 entries).—1st prem. $75, J. N. Shirts, Delevan, Ills.; 2nd. prem. $25, J. H. Burbank, Delevan, Ills.; 3rd. prem. $15, McCaw & Daniels, St. Louis.

3 9015 06690 8123